

Stanley
& Ross

FLORA

of South-eastern Queensland

Volume 3



QUEENSLAND HERBARIUM

QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES



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Volume III

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Flora of south-eastern Queensland *Volume III*

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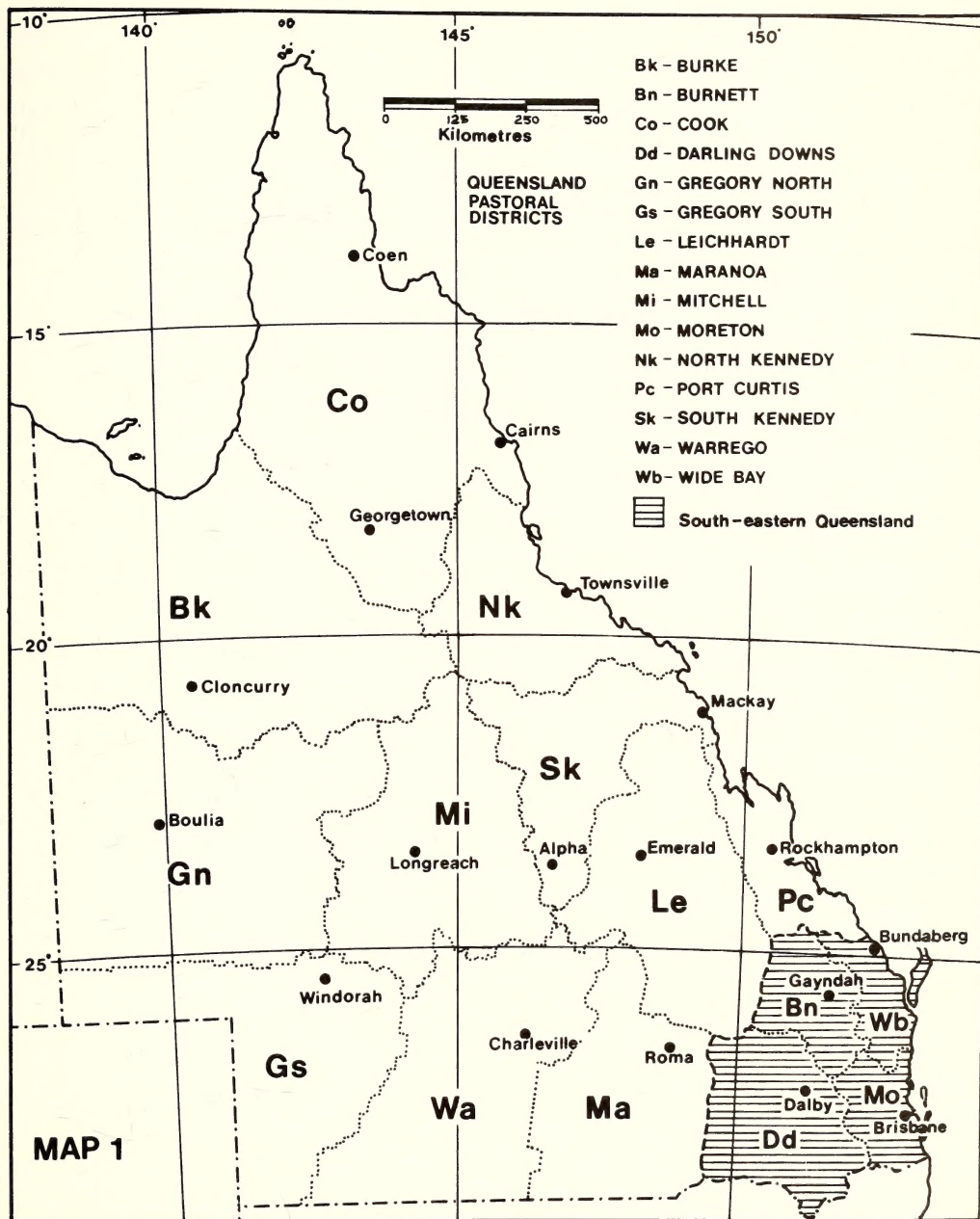
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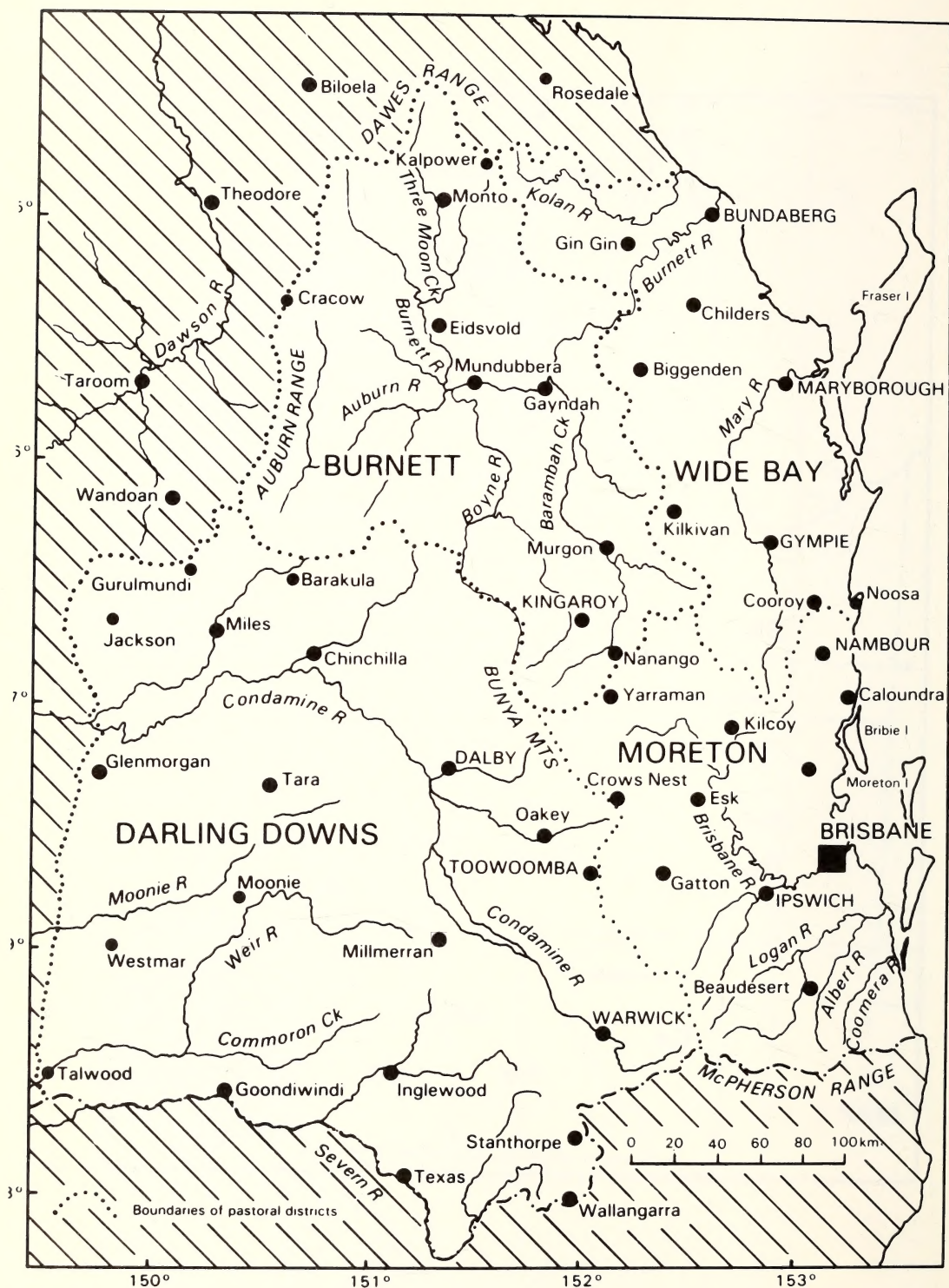
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INTRODUCTION

This is the third and final volume in the series. It contains all the species of monocotyledons plus all the species of the Gymnospermae known to occur in south-eastern Queensland. The total number of species of monocotyledons described in this volume is 1094 in 316 genera and 41 families and the total number of species of gymnosperms described is 20 in 8 genera and 6 families. The total number of species described in all three volumes of this flora is 3743 in 1223 genera and 202 families.

The format of Volume 3 remains the same as that of Volumes 1 and 2. The systematic arrangements of families used in Volume 3 is based on the system of J. Hutchinson, *The Families of Flowering Plants*, Volume 2, *Monocotyledons*; Oxford (1959).

Les Pedley of the Queensland Herbarium prepared the account of family 190 Pandanaceae. David Jones, now of the National Botanic Gardens, Canberra, prepared the accounts of the Orchidaceae genera 5, 7, 21, 22, 25–28, 30, 32 and 33. Phillip Sharpe of Coolumb Beach, Queensland, prepared the accounts of 183 Restionaceae, 193 Cyperaceae and the key to the species of *Juncus* in 179 Juncaceae. Rod Henderson prepared the accounts of the Liliaceae genera 5, 9, 10, 11, 18, 23 and family 169 Hypoxidaceae. Estelle Ross prepared the accounts of genera 1–68 of family 186 Poaceae, 196 Orchidaceae with the exception of those genera prepared by David Jones and families 197–202. Trevor Stanley prepared the accounts of families 156–164, 165 Liliaceae with the exception of those genera prepared by Rod Henderson, 166–168, 170–178, 179 Juncaceae with the exception of the key to the species of *Juncus*, 180–182, 184, 185, genera 69–121 of 186 Poaceae, 187–189, 191, 192, 194 and 195.

A list of the publications most commonly consulted by the authors in the preparation of all three volumes is given.

Species illustrated on the covers of the three volumes are as follows:

Volume 1

Front cover, *Pultenaea cunninghamii*

Back cover, *Geranium solanderi* var. *solanderi*

Volume 2

Front cover, *Eucalyptus planchoniana*

Back cover, *Angophora subvelutina*

Volume 3

Front cover, *Calanthe triplicata*

Back cover, *Micraira subulifolia*

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The preparation of the manuscripts for the three volumes of this flora would not have been possible without the untiring work of the various people who typed the manuscript, in particular Monica Humphrey who has supervised the typing of the entire project.

The authors would also like to thank Trevor Honour, Rosemary Lancaster and Alan Ernst of Information and Extension Training Branch of the Department of Primary Industries who arranged the publication and sale of the three volumes.

Special mention should be made of the illustrators, Margaret Saul, Gillian Rankin and Will Smith, who provided the line drawings for the work. The high standards of their illustrations has increased the usefulness of the work.

MONOCOTYLEDONS

KEY TO THE FAMILIES *

1. Plants of marine habitats, completely submerged in salt water	2
Plants of brackish or freshwater, marshy or land habitats	6
2. Leaves ligulate	162. Cymodoceaceae
Leaves eligulate	3
3. Leaves 1-3 per shoot	157. Hydrocharitaceae
Leaves 4 or more per shoot	4
4. Carpels 4-8; stigma peltate	164. Ruppiaceae
Carpel solitary; styles or stigmas 2 or 3, filiform	5
5. Perianth absent or represented by a row of bract-like lobes on each side of axis; stamen 1; stigmas 2	161. Zosteraceae
Perianth of 3 minute segments; stamens 3; styles 3	157. Hydrocharitaceae
6. Floating plants with 1 or more flat, leaf-like stems (thallus) 0.2-10 mm diameter, cohering by their edges, with or without roots hanging from the undersurface	189. Lemnaceae
Plants otherwise	7
7. Flowers unisexual	8
Flowers bisexual	31
8. Leaves opposite or verticillate	9
Leaves alternate, radical, crowded at stem apex or absent	11
9. Slender twining land plants	170. Dioscoreaceae
Aquatic or marsh plants	10
10. Male flowers with 2-lipped perianth, stamen 1; female flowers without perianth	163. Najadaceae
Male flowers with 3 or 6 perianth segments, stamens 3-9; female flowers with 3 or 6 perianth segments	157. Hydrocharitaceae
11. Leaves compound	187. Arecaceae
Leaves simple	12
12. Flowers closely packed into a dense simple unbranched spadix with a usually convolute coloured or petal-like spathe arising from base	13
Inflorescences not as above, often branched, though spathe sometimes present	14
13. Flowers bisexual or if unisexual, both males and females on the one inflorescence	188. Araceae
Flowers unisexual in separate inflorescences	190. Pandanaceae
14. Trees shrubs or climbers, aerial stem woody	15
Herbs or twiners, aerial stem herbaceous	18
15. Perianth absent; trees shrubs or climbers	16
Perianth with 3 outer and 3 inner segments, climbers	17
16. Individual flowers within imbricate scales or bracts, in small heads or spikelets	193. Cyperaceae
Individual flowers not separated by scales or bracts, but crowded in 1-several spadices	190. Pandanaceae

* Based on family key in H. T. Clifford and Gwen Ludlow, 1972. *Keys to the Families and Genera of Queensland Flowering Plants (Magnoliophyta)*, First Edition. St. Lucia: University of Queensland Press.

17. Ovary superior		176. Smilacaceae	
Ovary inferior		170. Dioscoreaceae	
18. Flowers inconspicuous, often minute, within imbricate scales or bracts, in heads or spikelets; perianth absent or of 1-8 scales or bristles, usually concealed within bracts			19
Flowers not as above, not within imbricate bracts			23
19. Flowers in spherical androgynous heads 2-8 mm diameter, or in small clusters with 2 sheathing basal bracts, terminal on a scape			20
Flowers in spikelets surrounded by glume-like bracts			21
20. Flowers in spherical androgynous heads 2-8 mm diameter		182. Eriocaulaceae	
Flowers in small clusters subtended by 2 sheathing basal bracts		184. Centrolepidaceae	
21. Leaf sheaths with margins connate into a tube around culm		193. Cyperaceae	
Leaf sheaths with free margins, though sometimes overlapping			22
22. Leaves with ligule at junction of leaf blade and sheath		186. Poaceae	
Leaves without ligules		183. Restionaceae	
23. Aquatic or marsh plants			24
Land plants			27
24. Ovary inferior		157. Hydrocharitaceae	
Ovary superior			25
25. Flowers in thick cylindrical terminal spikes		192. Typhaceae	
Flowers otherwise			26
26. Flowers in globular lateral heads		191. Sparganiaceae	
Flowers in several simple or slightly branched whorls		156. Alismataceae	
27. Climbers			28
Non-climbers			29
28. Ovary superior		176. Smilacaceae	
Ovary inferior		170. Dioscoreaceae	
29. Leaves large, pinnately or palmately divided (palms)		187. Arecaceae	
Leaves otherwise, generally linear or grass-like, or apparently absent			30
30. Fruits 3-locular, containing numerous small seeds per loculus		179. Juncaceae	
Fruits 3-locular, containing 1 seed per loculus		166. Xanthorrhoeaceae	
31. Flowers closely packed in simple spadix usually with coloured spathe \pm enclosing it		188. Araceae	
Flowers not in spadix though bracts may be present			32
32. Gynoecium apocarpous			33
Gynoecium syncarpous or carpel 1			40
33. Land plants			34
Aquatic or marsh plants			36
34. Woody plants; leaves compound, or pinnately or palmately divided (palms)		187. Arecaceae	
Small herbaceous plants; leaves simple, entire, linear			35
35. Perianth absent or apparently of 2 bracts		184. Centrolepidaceae	
Perianth of 6 petaloid segments		165. Liliaceae	
36. Perianth segments 2; stamens 6; carpels 3 in Australian species		158. Aponogetonaceae	
Perianth segments 3-6 or absent; stamens and carpels 2-many			37
37. Leaves opposite or alternate, not radical			38
Leaves radical			39

KEY TO THE FAMILIES

3

38. Perianth absent	164. Ruppiaceae	
Perianth segments 4	160. Potamogetonaceae	
39. Perianth segments all similar in texture and colour	159. Juncaginaceae	
Two perianth whorls different in texture and colour	156. Alismataceae	
40. Ovary superior or perianth absent		41
Ovary inferior		76
41. Flowers inconspicuous, often minute, within imbricate bracts or scales (glumes) in spikelets; perianth absent or of 1-8 scales or bristles, usually concealed within bracts		42
Flowers otherwise		45
42. Leaves with a ligule at junction of sheath and blade on ventral surface	186. Poaceae	
Leaves without a ligule or with a "contraligule" on the apex of the sheath on opposite side to junction of leaf blade and sheath		43
43. Stamens 2 or more	193. Cyperaceae	
Stamen 1		44
44. Small annuals; inflorescences scapose heads of 1 or more units of 2-many female florets and usually 1 male floret, heads with 2 sheathing bracts	184. Centrolepidaceae	
Rhizomatous perennials; inflorescences not as above, usually branched or numerous clusters of spikelets	193. Cyperaceae	
45. Perianth segments 4 or fewer		46
Perianth segments 6 or rarely 5		48
46. Stamen 1	174. Philydraceae	
Stamens 3 or 4		47
47. Stamens 3	181. Xyridaceae	
Stamens 4	188. Araceae	
48. Leaves compound (palms)	187. Arecaceae	
Leaves simple or absent		49
49. Stems woody; leaves broad (palms)	187. Arecaceae	
Not as above		50
50. Stamens 3 or 2		51
Stamens 6 or 5		56
51. Inner perianth segments united into a short 3-lobed tube	181. Xyridaceae	
Inner perianth segments \pm free		52
52. Two perianth whorls different in texture and colour	180. Commelinaceae	
Perianth segments all similar in texture and colour		53
53. Stamens inserted at base of inner perianth segments	167. Haemodoraceae	
Stamens free from perianth		54
54. Perianth segments petaloid	165. Liliaceae	
Perianth segments sepaloid		55
55. Carpels free or almost free; stigmas sessile	159. Juncaginaceae	
Carpels fused; style 1, stigmas 3	179. Juncaceae	
56. Leaf tips prolonged into tendrils		57
Leaf tips not prolonged into tendrils		58
57. Perianth up to 3 mm long	185. Flagellariaceae	
Perianth 10 mm or more long	165. Liliaceae	

58. Two perianth whorls different in texture and/or colour	.	.	.	.	.	.	.	.	59
Perianth segments all similar in texture and colour	.	.	.	.	.	.	.	.	61
59. Much branched leafy climbers	.	.	.	.	.	.	.	176. Smilacaceae	
Rosette or scrambling plant	.	.	.	.	.	.	.	.	60
60. Inner perianth segments fringed	.	.	.	.	.	.	.	165. Liliaceae	
Inner perianth segments not fringed	180. Commelinaceae	
61. Perianth segments petaloid	62
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62. Aquatic plants, floating or rooted	171. Pontederiaceae	
Land plants	63
63. Coarse woody climbers; venation predominantly reticulate	176. Smilacaceae	
Non-climbers or, if climbers, then venation convergent	.	.	.	.	.	.	.	.	64
64. Inflorescences a tall woody spike	.	.	.	.	.	.	.	166. Xanthorrhoeaceae	
Inflorescences otherwise	.	.	.	.	.	.	.	.	65
65. Leaves fleshy, sword-shaped, margins often toothed	66
Leaves thin, herbaceous	67
66. Inflorescences axillary	165. Liliaceae	
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69. Woody stemmed shrubs with leaves crowded on tips of branches	175. Agavaceae	
Tufted herbaceous plants	.	.	.	.	.	.	.	.	70
70. Inflorescences panicles; flowers in congested clusters; perianth persistent; stamens 6, fused at base and inserted on perianth	.	.	.	.	.	.	.	166. Xanthorrhoeaceae	
Inflorescences and flowers not the above combination of characters	.	.	.	.	.	.	.	165. Liliaceae	
71. Marsh or aquatic plants	.	.	.	.	.	.	.	159. Juncaginaceae	
Land plants	.	.	.	.	.	.	.	.	72
72. Climbers	.	.	.	.	.	.	.	188. Araceae	
Non-climbers	.	.	.	.	.	.	.	.	73
73. Style branched, stigmas 3	.	.	.	.	.	.	.	179. Juncaceae	
Style 1, simple, stigma 1	.	.	.	.	.	.	.	.	74
74. Inflorescences a tall woody spike	.	.	.	.	.	.	.	166. Xanthorrhoeaceae	
Inflorescences otherwise	.	.	.	.	.	.	.	.	75
75. Inflorescences panicles; flowers in congested clusters; perianth persistent; stamens 6, fused at base and inserted on perianth	.	.	.	.	.	.	.	166. Xanthorrhoeaceae	
Inflorescences and flowers not the above combination of characters	.	.	.	.	.	.	.	165. Liliaceae	
76. Flowers gynandrous (stamens adnate to pistil)	.	.	.	.	.	.	.	.	76
Flowers not gynandrous	.	.	.	.	.	.	.	.	79
77. Venation pinnate	.	.	.	.	.	.	.	195. Cannaceae	
Venation convergent or parallel, longitudinal	.	.	.	.	.	.	.	.	78
78. Stamens 6, inserted near base of style	.	.	.	.	.	.	.	169. Hypoxidaceae	
Anther 1, at or near apex of column	.	.	.	.	.	.	.	196. Orchidaceae	

- | | | |
|--|-----------------------|----|
| 79. Submerged aquatics; leaf blades submerged or floating; styles 3 or stigmas 6, each 2-lobed | 157. Hydrocharitaceae | 80 |
| Plants not as above | | |
| 80. Climbing plants; leaves alternate with many longitudinal veins from midrib, secondary venation reticulate | 178. Petermanniaceae | 81 |
| Plants not as above | | |
| 81. Venation obviously pinnate | | 82 |
| Venation convergent (middle vein sometimes more obvious than others), parallel, or sometimes obscured by thickness of leaf | | 83 |
| 82. Ligules present at junction of leaf sheath and leaf blade | 194. Zingiberaceae | |
| Leaves without ligules | 195. Cannaceae | |
| 83. Stamens 3 | | 84 |
| Stamens 6 or rarely 5 or 4 | | 87 |
| 84. Perianth segments united at base | | 85 |
| Perianth segments free | | 86 |
| 85. Anthers with transverse dehiscence | 173. Burmanniaceae | |
| Anthers with longitudinal dehiscence | 172. Iridaceae | |
| 86. Ovules 1 or 2 per loculus | 167. Haemodoraceae | |
| Ovules usually several per loculus | 172. Iridaceae | |
| 87. Flowers in umbels, rarely solitary on a leafless scape | | 88 |
| Flowers in simple or compound racemes or spicate | | 89 |
| 88. Fruits capsules or berries, not crowned by persistent perianth | 168. Amaryllidaceae | |
| Fruits capsules crowned by persistent perianth | 169. Hypoxidaceae | |
| 89. Leaves narrow, up to 0.2 m long, arising from an underground rhizome or corm | 169. Hypoxidaceae | |
| Leaves thick, fibrous, up to 3 m long, in tufts at base or apex of trunk-like stem | 175. Agavaceae | |

156. ALISMATACEAE

Annual or perennial marsh or aquatic herbs of fresh or brackish water. Leaves basal; petioles sheathing but open at base. Inflorescences racemose or paniculate, bracteate; flowers bisexual or unisexual; perianth 2-seriate, outer 3 segments green, sepal-like, imbricate, persistent, inner 3 petaloid, imbricate, deciduous or rarely absent; stamens free; carpels usually free, ovary superior. Fruits achenes, in clusters or whorls.

13 genera with *ca* 90 species, cosmopolitan; 4 genera with 8 species Australia; 2 genera with 2 species south-eastern Queensland.

- | | |
|---|----------------------|
| 1. Carpels free, scarcely beaked, not spreading stellately in fruit | 1. <i>Sagittaria</i> |
| Carpels united at base, long beaked, spreading stellately in fruit | 2. <i>Damasonium</i> |

1. SAGITTARIA L.

Perennials, scapigerous, usually stoloniferous. Leaves long petiolate; blades narrowly ovate to sagittate, occasionally absent. Inflorescences of several simple or slightly branched whorls; flowers unisexual, inner perianth segments longer than outer ones; stamens numerous; carpels numerous. Achenes flat, membranous, usually winged.

20 species, cosmopolitan; 4 species reported naturalized Australia; 1 species south-eastern Queensland.

- 1. **Sagittaria graminea* Michaux var. *weatherbiana* (Fernald) Bogin** SAGITTARIA
Sagittaria weatherbiana Fernald
 Erect, emergent, attached to substrate. Leaves radical; petioles of emergent leaves up to

55 cm long, winged on inner angles towards base; emergent leaf blades narrowly ovate to elliptic, 7–18 cm × 2–8 cm; submerged leaves strap-shaped or tapered-terete without expanded blades, up to 50 cm × 1–2.5 cm. Scape unbranched, 5–120 cm long; male and female flowers on pedicels up to 7 cm long; petals whitish. Achenes without wings or with 1–3 narrow ones.

Native of North America; reported naturalized in two localities in Brisbane, both localities now altered by suburban development with the subsequent destruction of the populations.

2. DAMASONIUM Miller

Annual, scapigerous. Leaves radical, long petiolate. Inflorescences of several, usually simple whorls; flowers bisexual; outer perianth segments persistent, inner perianth segments deciduous; carpels connate at base. Achenes laterally compressed, long beaked.

5 species, widely distributed in temperate regions of the world; 1 species Australia, occurring in south-eastern Queensland.

1. **Damasonium minus** (R. Br.) Buchenau STARFRUIT

Actinocarpus minor R. Br.; *Damasonium australe* Salisb.
Leaf blades narrowly ovate to ovate, base often cordate, 2–10 cm × 0.5–3.5 cm; nerves 3–5, longitudinal. Scapes 1–50 cm long, pedicels up to *ca* 2 cm long; flowers small. Achenes triangular, united by their broad bases, spreading stellately, beaked. **Fig. 1A.**

Moreton and Darling Downs districts in freshwater pools and marshy areas in shallow semipermanent water up to *ca* 15 cm deep; not common. Flowers spring–summer.

157. HYDROCHARITACEAE

Perennial or annual freshwater or marine herbs, partly or wholly submerged. Leaves undivided, radical or cauline, usually sessile, nerves ± parallel. Flowers mostly unisexual, actinomorphic, arranged in a spathe; hypanthiums well developed in flowers of most genera; perianth of 3 or 6 segments, free, 1- or 2-seriate, outer series valvate, often sepaloid, inner series imbricate, petaloid; stamens 3–12 rarely more, in 1–several whorls, inner whorls sometimes sterile, anthers basifixed, 2–4-locular; ovary usually inferior, 1–several-locular, ovules numerous, styles 2–15. Fruits indehiscent, rarely stellately dehiscent, ripening underwater; seeds several–many, without albumen.

16 genera with 80 species, tropical and temperate areas worldwide; 10 genera with 19 species native or naturalized Australia; 7 genera with 10 species south-eastern Queensland.

1. Marine plants	1. <i>Halophila</i>	
Freshwater plants		2
2. Leaves on a distinct stem and in whorls		3
Leaves all radical or in rosettes connected by stolons		4
3. Stamens 3; stigmas 3, undivided; male flowers without hypanthium; leaf margins strongly serrulate; leaves in whorls of 3–8, whorls mostly well spaced with stem internodes 0.5–7 cm long	2. <i>Hydrilla</i>	
Stamens 9; stigmas 3, deeply 3- or 4-lobed; male flowers with hypanthium; leaf margins minutely serrulate; leaves in whorls of 3–6, whorls close together with stem internodes up to 0.8 cm long	3. <i>Egeria</i>	
4. Leaves linear or strap-shaped, sessile		5
Leaves elliptic or narrowly ovate to suborbicular, petiolate		6
5. Hypanthiums absent; plants dioecious, male flowers minute, detaching at maturity and floating on water surface; peduncles of female flowers long and coiling after fertilization	4. <i>Vallisneria</i>	
Hypanthiums present; plants with bisexual flowers or plants monoecious or dioecious and then male flowers conspicuous and not detaching at maturity; peduncles not coiling after fertilization	5. <i>Blyxa</i>	

6. Stolons absent; spathes with longitudinal ribs or wings; flowers bisexual, solitary and sessile within each spathe
 Stolons present; spathes not ribbed or winged; flowers unisexual, males shortly pedicellate and 1-4 per spathe, females solitary and long pedicellate in each spathe

6. *Ottelia*7. *Hydrocharis*

1. HALOPHILA Thouars

Attached, submerged, marine, dioecious or monoecious. Stems creeping, rooting at nodes. Leaves opposite, petiolate or sessile; blades thin, oblong or ovate to linear, 3-nerved. Spathes sessile; 1 or more male flowers and/or 1 female flower per spathe; male flowers pedicellate, emerging from spathe, perianth segments 3, stamens 3; female flowers \pm sessile, enclosed in spathe, perianth segments 3, minute, styles 3. Fruits beaked, membranous.

10 species from tropical coasts of Indian and Pacific Oceans and Caribbean Sea; 4 species Australia; 3 species south-eastern Queensland.

- | | | |
|--|------------------------|---|
| 1. Leaves sessile or nearly so; lateral shoots up to 18 cm long | 1. <i>H. spinulosa</i> | |
| Leaves with petioles 0.3-8 cm long; lateral shoots up to 1 cm long | | 2 |
| 2. Lateral shoots scarcely or not developed; leaves glabrous | 2. <i>H. ovalis</i> | |
| Lateral shoots 0.5-10 mm long; leaves hairy on one or both sides | 3. <i>H. decipiens</i> | |

1. *Halophila spinulosa* (R. Br.) Aschers.

A SEA GRASS

Caulinia spinulosa R. Br.

Plants dioecious. Leaves in 10-20 pairs distichously arranged along shoots 5-18 cm long, sessile; blades oblong to linear, margin serrulate, 1-2.3 cm \times 0.2-0.5 cm, glabrous, cross-veins 4 or 5 pairs. Male flowers with perianth segments 3-4 mm long, anthers 4-locular; female flowers with style 1-1.2 cm long. Fruits *ca* 3-5 mm long.

Sheltered localities, usually in water up to *ca* 5 m deep on sand or sandy mud.

2. *Halophila ovalis* (R. Br.) J. D. Hook.

SEA WRACK

Caulinia ovalis R. Br.

Plants dioecious. Leaves 1 pair on scarcely or not developed shoot; petioles 1-8 cm long; blades oblong, elliptic or ovate, margin entire, 0.5-7 cm \times 0.3-2 cm, glabrous, cross-veins 10-25 pairs. Male flowers with perianth segments *ca* 4 mm long, anthers 2-4-locular; female flowers with styles 1.3-1.8 mm long. Fruits 3-4 mm long. **Fig. 1B.**

Sheltered localities in shallow water on sandy or muddy substrates or descending to several metres below low tide level on a variety of substrates.

3. *Halophila decipiens* Ostenf.

A SEA GRASS

Plants monoecious. Leaves 1 pair on hairy shoot 1-10 mm long; petioles 0.3-1.5 cm long; blades oblong to elliptic, margin finely serrulate, 1-2.3 cm \times 0.3-0.6 cm, hairy on one or both sides, cross-veins 6-9 pairs. Male flowers with perianth 1-1.5 mm long, anthers 2-4-locular; female flowers with styles *ca* 2.5 mm long. Fruits *ca* 2.5 mm long.

Found in waters north of Pialba in the Wide Bay district, at depths of 2 m or more on muddy coral sand.

2. HYDRILLA Rich.

Attached, submerged, freshwater, caulescent herbs, monoecious or dioecious; stem internodes 0.5-7 cm long. Leaves in whorls of 3-8, but mostly in whorls of 4-6, sessile, margin strongly serrulate, midrib conspicuous. Spathes solitary, axillary; male flowers 1 per spathe, separating from spathe, hypanthium absent, sepals 3, stamens 3; female flowers 1 or rarely 2 per spathe, sepals 3, petals 3, stigmas 3, undivided.

1 species widespread in Europe, Africa and Australia, occurring in south-eastern Queensland.

1. *Hydrilla verticillata* (L. f.) Royle

HYDRILLA; WATER THYME

Serpicula verticillata L. f.

Plants much branched. Leaves linear to narrowly ovate, apex acute, 0.6-4 cm \times

0.1–4 cm. Male flowers with sepals 1–2 mm long, petals 0.8–1.8 mm long, membranous, hypanthium up to *ca* 10 cm long. Fruits *ca* 7 mm long. **Fig. 1E.**

Throughout the region in lakes, pools and in slow moving streams; common. Flowers spring to autumn.

Female flowers of this species are pollinated at the surface of the water. The unopened female flowers are carried to the surface by elongation of the hypanthium. Once there the petals open. The unopened male flowers become detached from the plant and rise to float on the water surface where their petals open, followed by the explosive dehiscence of the anthers and the dispersal of pollen for up to 20 cm. If a female flower is within range it may be pollinated. The species also spreads by vegetative means. Small sections of stem readily produce roots when in a suitable location.

3. *EGERIA* Planchon

Attached, submerged, freshwater, caulescent herbs, dioecious; stem internodes up to 8 mm long. Leaves in whorls of 3–6, but mostly in whorls of 4 or 5, sessile, margin minutely serrulate, midrib conspicuous. Spathes solitary, axillary; male flowers 1–5 per spathe, sepals 3, petals 3, stamens 9, rarely 10; female flowers 1 per spathe, sepals 3, petals 3, stigmas 3, each 3- or rarely 4-lobed; hypanthiums present.

2 species, South America; 1 species naturalized Australia, occurring in south-eastern Queensland.

1. **Egeria densa* Planchon

DENSE WATERWEED

Elodea densa (Planchon) Casp.; *Anacharis densa* (Planchon) Marie-Vict.

Plants densely foliated. Leaves oblong to broadly linear, apex acute, 1–4 cm × 0.2–0.5 cm. Male and female flowers with hypanthiums, male hypanthium breaking to allow flower to float to surface; male flowers with sepals 3–4 mm long, petals white, 0.9–1.2 cm long; female flowers with hypanthium up to *ca* 20 cm long, sepals *ca* 3 mm long, petals white, 6–9 mm long. Fruits *ca* 7 mm long. **Fig. 1D.**

Native of South America; reported as being apparently naturalized from a few localities around Toowoomba and Brisbane, in still or slow moving water; capable of forming dense masses. Flowers spring to autumn.

In Australia seeds are seldom produced and reproduction is mainly vegetative with small portions of the stem rooting readily and quickly producing new growth.

4. *VALLISNERIA* L.

Attached, submerged, freshwater stoloniferous herbs, dioecious. Leaves radical, apex obtuse, base sheathing, margin minutely dentate or entire, nerves 3–9, longitudinal air channels present. Flowers without hypanthiums; male spathes pedunculate, male flowers minute, several per spathe, breaking off at maturity, sepals 3, petals 3, stamens 1–3; female spathes on very long peduncles spirally contracted after anthesis, female flower 1 per spathe, sepals 3, petals 3, styles 3, each 2-lobed. Fruits cylindrical.

About 10 species, tropical and subtropical areas worldwide; 2 or 3 species Australia; 1 species south-eastern Queensland.

1. *Vallisneria spiralis* L.

EELWEED; RIBBON WEED

Leaves in rooted tufts along stolons, strap-shaped, up to 600 cm × 0.2–2.7 cm. Male spathes with peduncles up to *ca* 7 cm long, male flowers numerous, clustered on central column enclosed in spathe, released from spathe at maturity; female spathes 1.5–2 cm long, on long peduncles reaching to the water surface, peduncles spirally coiled after pollination, female flowers 1.5–2.5 cm long, sepals *ca* 2 mm long, petals minute, alternate with sepals. Fruits narrowly cylindrical, mostly 3–9 cm × *ca* 0.4 cm; seeds numerous, *ca* 1.5–2 mm long. **Fig. 2A.**

Widespread in the region, in still to swift moving waters up to 3 m deep, e.g. streams, lakes, ponds and irrigation channels; common. Flowers spring to autumn.



Fig. 1 **A ALISMATACEAE** — A *Damasonium minus*, fruiting plant x 1; **B-E HYDROCHARITACEAE** — **B₁-B₂** *Halophila ovalis*, **B₁** part of plant x 1; **B₂** spathes enclosing fruit x 3; **C** *Halophila spinulosa*, part of plant x 1; **D₁-D₂** *Egeria densa*, **D₁** part of flowering stem x 1, **D₂** leaf x 3; **E₁-E₂** *Hydrilla verticillata*, **E₁** part of flowering plant x 1, **E₂** leaf x 3.

For fertilization to occur, the peduncle of the unopened female flower elongates to carry the flower to the surface where the flower opens. Individual unopened male flowers become detached from the central axis in the spathe and float to the surface where they open. Pollination occurs when a floating male flower contacts a female flower. After pollination, the peduncle of the fertilized female flower coils spirally and pulls the flower underwater where the fruits develop.

5. *BLYXA* Noronha ex Thouars

Attached, submerged, freshwater, stoloniferous herbs, monoecious, dioecious or flowers bisexual. Leaves radical, linear-tapered, base sheathing, margin minutely serrulate, nerves 5–9. Flowers unisexual or bisexual, hypanthium present, sepals 3, petals 3, stamens 3, 6 or 9, styles 3, connate at base. Fruits narrow, tubular; seeds many, ovoid, testa with 8 longitudinal rows of \pm distinct tubercules or spines, filiform projections sometimes present.

10 species Africa, Madagascar and Australia; 3 species Australia; 1 species south-eastern Queensland.

1. *Blyxa aubertii* Rich.

Leaves 5–50 cm \times 0.5–1 cm. Hypanthiums up to 4 cm long; sepals 0.7–1.5 cm long; petals 1–2.5 cm long, longer than sepals; stamens 3. Fruits terete, 3–6 cm long.

Two varieties occur in the region:

- | | |
|---|---|
| 1. Seeds smooth or with irregular interrupted ridges or wings, sometimes giving the seeds a muricate appearance | <i>B. aubertii</i> var. <i>aubertii</i> |
| Seeds distinctly spiny, with spines at apex and/or base | <i>B. aubertii</i> var. <i>echinosperma</i> |

Both *Blyxa aubertii* var. *aubertii* and *B. aubertii* var. *echinosperma* (C. B. Clarke) C. D. K. Cook & Luond (*Hydrotrophus echinospermus* C. B. Clarke) are found in eastern parts of the region in still or slow moving waters up to 2 m deep. Both flower spring to autumn.

Vegetative characters of this species are similar to those of juvenile plants of *Ottelia ovalifolia* (R. Br.) Rich.

6. *OTTELIA* Pers.

Attached, submerged or emergent freshwater herbs. Leaves radical, petiole base sheathing. Spathe with prominent ribs or wings, peduncled, 1-flowered; flowers bisexual in Australian species, sessile within spathe, conspicuous in Australian species; sepals 3, persistent; petals 3, longer than sepals; stamens 6–15, 6–12 in Australian species; styles 6–15, 6–9 in Australian species, bifid. Fruits with thickened pericarp.

40 species tropical and subtropical, worldwide; 2 species Australia, both occurring in south-eastern Queensland.

- | | |
|---|-------------------------|
| 1. Leaf blades submerged, broadly ovate to suborbicular, thin and translucent; spathe with 5–10 conspicuous longitudinal wings, sometimes wings reduced to ribs | 1. <i>O. alismoides</i> |
| Leaf blades floating on water surface, elliptic to ovate, thick and opaque; spathe ribbed but without wings | 2. <i>O. ovalifolia</i> |

1. *Ottelia alismoides* (L.) Pers.

Stratiotes alismoides L.

Leaves submerged, sometimes partly emergent in shallow water; petioles 3-sided, 8–50 cm long; blades thin, translucent, broadly ovate to suborbicular, 7–22 cm \times 4.5–21 cm. Spathes 2.5–6 cm long with 5–10 longitudinal wings; sepals 1–1.5 cm long; petals white with yellow-spotted base, 2–3 cm long. Fruits enclosed in spathe; seeds glabrous.

Eastern parts of the region in slow streams and stagnant pools up to 1.5 m deep, on a muddy bottom; not common. Flowers spring to autumn.

2. *Ottelia ovalifolia* (R. Br.) Rich.

SWAMP LILY

Damasonium ovalifolium R. Br.

Leaves emergent; petioles terete, up to 120 cm long; blades floating, thick, opaque, elliptic to ovate, 2–16 cm × 1–10 cm. Flowers of two kinds, chasmogamous and cleistogamous; spathe 3–6 cm long, ribbed but not winged; chasmogamous flowers emergent, sepals 1.5–2.5 cm long, petals cream with dark base, *ca* 3 cm long; cleistogamous flowers submerged. Fruits enclosed in spathe; seeds with numerous fine appressed hairs. **Fig. 2B.**

Widespread in the region in still water in ponds, dams, etc., up to a depth of 60 cm or more on muddy bottoms, occasionally found in slow or even fast moving streams; moderately common. Occasionally troublesome in stocktanks. Flowers spring to autumn.

Juvenile plants have strap-shaped leaves and may be confused with *Vallisneria spiralis* L. and *Blyxa* spp.

7. HYDROCHARIS L.

Freefloating or attached freshwater stoloniferous herbs, monoecious. Leaves floating or aerial, stipulate, petiolate; floating leaves with coarse aerenchyma cushion on underside of leaves. Male spathes shortly pedunculate, with 1–4 shortly pedicellate male flowers, female spathes sessile with 1 long pedicellate female flower; sepals 3; petals 3; male flowers with 9–12 stamens; female flowers with 6 styles. Fruits berry-like.

3 species Europe, Africa, Asia and Australia; 1 species Australia, occurring in south-eastern Queensland.

1. *Hydrocharis dubia* (Blume) Backer

FROGBIT

Pontederia dubia Blume; *Hydrocharis morsus-ranae* auct. Aust. non L.

Petioles up to 12 cm long; blades broadly ovate to rounded, apex obtuse to rounded, base cordate to reniform or truncate, 2–7 cm × 2–7 cm. Flowers erect, aerial, conspicuous; sepals 4–8 mm long; petals white or pale yellow, 0.8–1.5 cm long; male flowers with 12 stamens; female flowers with 3 staminodes. Fruits 5–10 mm long, maturing underwater; seeds echinate.

Eastern parts of the region, floating in deep water or rooted in shallow water, in pools, lakes or slow moving streams. Flowers spring to autumn.

Thalassia hemprichii (Ehrenb.) Aschers., a marine aquatic has been reported from “Nerang River” (H. Aston (1977), *Aquatic Plants of Australia*. Melbourne: Melbourne University Press); however the Queensland Herbarium has no specimens from southern Queensland waters and other workers on sea-grasses (P.C. Young & H. Kirkman (1975), *The Seagrass Communities of Moreton Bay. Aquatic Botany* 1: 191–202) also have not found it in southern Queensland waters. It seems unlikely that the species occurs in the region.

158. APONOGETONACEAE

Perennial freshwater aquatic herbs, with sympodial tuberous rhizomes; roots fibrous. Leaves petiolate, base sheathing; blades with few principal longitudinal nerves and many secondary transverse nerves. Spathes present; inflorescences simple or forked spikes, bracts absent; flowers bisexual; perianth segments 1–3 or absent; stamens 6 or more; ovary superior, carpels 3–6, sessile. Fruits follicles.

1 genus with 30 species, tropics and subtropics; 5 species Australia; 2 species south-eastern Queensland.

1. APONOGETON L. f.

Characters as for family.

- | | |
|---|-----------------------------|
| 1. Leaves floating; plants found in temporary waters | 1. <i>A. queenslandicus</i> |
| Leaves mostly submerged; plants found in permanent waters | 2. <i>A. elongatus</i> |

1. *Aponogeton queenslandicus* H. W. E. van Bruggen*Aponogeton monostachyus* auct. Aust. non L. f.

Leaves nearly always floating; petioles 5–25 cm long; blades narrowly elliptic, apex bluntly acuminate, base cordate or rounded, 5–11 cm \times 0.8–3 cm. Peduncles 10–30 cm long; spikes densely flowered, up to 9 cm long; perianth segments 2, *ca* 2 mm long; stamens 6. Fruits up to *ca* 8 mm long.

Darling Downs district in temporary waters 30–60 cm deep, in sunny positions on clay substrates. It does not occur in water deeper than about 60 cm nor in permanent waters.

2. *Aponogeton elongatus* F. Muell. ex Benth.

Aponogeton elongatus forma *longifolius* H. W. E. van Bruggen; *A. elongatus* forma *latifolius* H. W. E. van Bruggen; *A. crispus* auct. Aust. non Thunb.

Leaves mostly submerged; petioles 1–50 cm long; blades linear or narrowly elliptic, 2.5–55 cm \times 0.5–5 cm. Peduncles up to 5 m long; spikes sparsely flowered, up to 20 cm long; perianth segments 2, 1.5–2.5 mm long; stamens 6. Fruits 5–6 mm long.

Mainly in coastal or subcoastal areas, in permanent still to flowing waters of rivers, creeks and backwaters, mostly with muddy or silty substrates; not common.

This species shows considerable variation in the shape of the leaves and in the dimensions of the leaf blades and petioles.

159. JUNCAGINACEAE

Marsh or aquatic herbs of fresh or brackish water, scapigerous, rhizomatous, sometimes with tuberous roots. Leaves mostly radical, linear, broadly sheathing at base. Inflorescences terminal spikes or racemes, bracts absent; flowers usually bisexual, small; perianth segments usually green and sepeloid, 2–6, 2-seriate; stamens usually 4 or 6; carpels superior, 1–6, free or connate.

3 genera with 25 species, mainly from temperate and cold regions of both hemispheres; 2 genera with 15 species Australia; 2 genera with 3 species south-eastern Queensland.

- | | |
|--|----------------------|
| 1. Ovules pendulous; fruiting carpels remaining united and forming a 2–4-angled, squat, cylindrical fruit | 1. <i>Maundia</i> |
| Ovules erect; fruiting carpels separating, while together forming a subglobular to globular-ovoid to broadly ellipsoid fruit | 2. <i>Triglochin</i> |

1. MAUNDIA F. Muell.

Erect perennial, rhizomatous. Leaves arising in tufts along rhizome, \pm spongy. Inflorescences elongated spike-like racemes, scapes erect; perianth segments 4–6; anthers 4–6; carpels 2–4, united along whole length of inner face, ovules pendulous from apex of loculus. Fruits of 1–4 fertile carpels; fruiting carpels united at adaxial angle, with spongy covering on ventral surface, edges and beak recurved.

1 species endemic in eastern coastal Australia, occurring in south-eastern Queensland.

1. *Maundia triglochinoides* F. Muell.*Triglochin maundii* F. Muell.

Rhizomes 2–5 mm thick, rooting along their length. Leaves compressed-terete, gradually tapering upwards, up to 75 cm \times 6–15 cm. Inflorescences 6–10 cm long; perianth segments *ca* 2 mm long. Fruits cylindrical; fruiting carpels 6–8 mm long, each carpel \pm obtusely angled on the back and bearing a narrow recurved wing.

Coastal freshwater swamps in water up to 60 cm deep; rare.

2. TRIGLOCHIN L.

Marsh or aquatic herbs. Leaves radical, linear or filiform. Inflorescences simple spikes or racemes on long leafless scapes; flowers usually bisexual; perianth segments usually green,



Fig. 2 A-B **HYDROCHARITACEAE** — A₁-A₂ *Vallisneria spiralis*, A₁ female plant with flowers x $\frac{2}{3}$, A₂ male plant showing spathes x 1; B *Ottelia ovalifolia*, flower with spathe x $\frac{1}{2}$; C **JUNCAGINACEAE** — C₁-C₃ *Triglochin striata*, C₁ plant x 1, C₂ flower x 10, C₃ fruiting inflorescence x 3.

herbaceous, 6, deciduous; stamens 6 or fewer; carpels 3–6; ovules 1 per carpel, erect. Fruits of 3–6 indehiscent 1-seeded carpels.

About 15 species, mainly Australia and South America; *ca* 14 species Australia; 2 species south-eastern Queensland.

1. Fruits with usually all carpels fertile, all falling from the pedicel, no carpophore present; leaf sheath without ligule

1. *T. procera*

- Fruits with 3 fertile carpels alternating with 3 sterile carpels, fertile ones falling from pedicel, sterile ones persisting to form a 3-winged carpophore; leaf sheath with ligule

2. *T. striata*

1. *Triglochin procera* R. Br.

WATER RIBBONS

Robust perennial; rhizomes thick, bearing roots which end in tubers. Leaves radical, erect or upper part floating, linear, flat to plano-convex, 15–300 cm × 0.5–3.5 cm. Inflorescences spike-like racemes, erect, 7–20 cm long or longer; scapes cylindrical, up to 50 cm long, rarely longer; pedicels 1–2 mm long; flowers small. Fruits subglobular to broadly ellipsoid, sometimes spirally twisted; fruiting carpels 3 or 6, indehiscent, elongated, 0.4–1.1 cm long.

Throughout the region, in still to fast moving fresh water streams and swamps, at depths up to *ca* 1 m; moderately common.

As described above the species is extremely variable, the variation being mainly in the habit and in the shape and size of the carpels and leaves. A comprehensive study is needed to decide whether the material belongs to more than one species or to a single highly polymorphic species.

One form found in the region which has 3 carpels per flower, rarely more, and all the carpels entirely free from each other, is referable to *T. procera* var. *dubia* (R. Br.) Benth. (*T. dubia* R. Br.).

2. *Triglochin striata* Ruiz & Pavon

STREAKED ARROWGRASS

Erect perennial. Leaves arising in tufts from swollen rootstocks along rhizome; leaf sheaths 1–11 cm long with noticeable obtuse ligule 1–5 mm long; blades linear to almost filiform, 2–50 cm × 0.1–0.3(–0.5) cm. Inflorescences erect, spike-like racemes 1–15 cm long, rarely longer; scapes cylindrical, ± equal in length to raceme. Fruits globular-ovoid, 2–3 mm long; fertile carpels falling leaving 3 sterile carpels forming a winged carpophore. Fig. 2C.

Eastern parts of the region, in mud or shallow water of fresh, brackish or saline swamps, lakes and river edges.

160. POTAMOGETONACEAE

Freshwater aquatic herbs. Leaves all submerged and thin or upper with floating often coriaceous blades; stipules stem-sheathing. Inflorescences pedunculate axillary spikes; flowers bisexual, small, bracts absent; perianth segments 4, free, clawed, valvate; stamens 4, inserted on claws of perianth segments; carpels 4, sessile, free, 1-locular. Fruiting carpels sessile, free, indehiscent; seed solitary, without endosperm.

2 genera with *ca* 100 species, cosmopolitan; 1 genus with 8 species Australia; 1 genus with 6 species south-eastern Queensland.

1. *POTAMOGETON* L.

Perennial, rhizomatous. Leaves alternate except those subtending inflorescences, each leaf with an axillary membranous stipular sheath. Spikes simple, cylindrical. Fruiting carpels drupaceous with hard endocarp and soft exocarp, shortly beaked.

About 99 species worldwide; 8 species Australia; 6 species south-eastern Queensland.

- | | |
|---|----------------------------|
| 1. Leaves all similar, all submerged, sessile | 2 |
| Leaves dissimilar, upper ones emergent, floating, petiolate | 5 |
| 2. Lower part of stipular sheaths adnate to leaf, upper part free and forming distinct ligule; leaf blades mostly less than 2 mm wide | 1. <i>P. pectinatus</i> |
| Stipular sheaths almost completely free from leaf, not forming ligule; leaf blades mostly greater than 2 mm wide | 3 |
| 3. Leaves stem clasping, cordate at base | 2. <i>P. perfoliatus</i> |
| Leaves neither stem clasping, nor cordate at base | 4 |
| 4. Leaves with minutely toothed margins; 3-5-nerved, without fine intermediate nerves | 3. <i>P. crispus</i> |
| Leaves with entire margins; 3-5-nerved, with numerous fine intermediate longitudinal nerves | 4. <i>P. ochreatus</i> |
| 5. Submerged leaves slender, linear, less than 3 mm broad; floating leaves 0.5-1 cm wide | 5. <i>P. javanicus</i> |
| Submerged leaves narrowly elliptic to broadly obovate, more than 3 mm wide; floating leaves 0.9-7 cm wide | 6. <i>P. tricarlinatus</i> |

1. *Potamogeton pectinatus* L.**FENNEL PONDWEED; SAGO PONDWEED**

Stems slender, much branched, up to 3 m long. Stipular sheath with basal part adnate to leaf blade for 0.5-2.5 cm, free above, forming stem-clasping ligule 0.3-1.5 cm long; leaves submerged, sessile, narrow-linear, 1.5-15 cm \times 0.05-0.2 cm. Spikes few-flowered, 1.5-6 cm long, peduncles slender, 2-20 cm long or longer. Fruiting carpels 2.5-4 mm long. **Fig. 3A.**

In still to swiftly moving, fresh to brackish waters of streams, dams, etc. up to 3 m deep; rare in the region. Capable of forming dense masses. Flowers spring-summer.

2. *Potamogeton perfoliatus* L.**PERFOLIATE PONDWEED**

Potamogeton praelongus auct. Aust. non Wulf

Stems up to 2 m long. Stipular sheath *ca* 1 cm long, transparent, short-lived; leaves submerged, sessile, thin and translucent, broadly ovate to ovate or triangular, base cordate and stem clasping, margin \pm undulate, 1-6 cm \times 1-4 cm, nerves numerous, longitudinal. Spikes dense, 1-2 cm long, peduncles up to 7 cm long. Fruiting carpels 2.5-3 mm long. **Fig. 3B.**

East of the Great Dividing Ra., in still to strongly flowing water in streams and rivers up to 3 m deep, on muddy, sandy or gravelly substrates; moderately common. Flowers and fruits summer-autumn.

3. *Potamogeton crispus* L.**CURLY PONDWEED**

Stems compressed, up to *ca* 4 m long. Stipular sheaths *ca* 1 cm long, transparent, often disintegrating; leaves submerged, sessile, thin and translucent, linear-elliptic to narrowly ovate, apex obtuse, margin serrulate, \pm crisped, 2-7 cm \times 0.5-1.5 cm, nerves 3-5, longitudinal, intermediate nerves absent. Spikes *ca* 1 cm long, with 3-5 \pm well spaced flowers, appearing \pm dense when in fruit and then 1-2 cm long, peduncles 2.5-7.5 cm long. Fruiting carpels 5-7 mm long. **Fig. 3C.**

Throughout the region in still to fast moving waters in rivers, streams, dams, etc. up to 4.5 m deep, on muddy, sandy or gravelly substrates; common. The species has been reported as a weed in farm dams.

4. *Potamogeton ochreatus* Raoul**BLUNT PONDWEED**

Potamogeton furcatus Hagström; *P. obtusifolius* auct. Aust. non Mert. & Koch

Stems up to *ca* 4.5 m long. Stipular sheath up to 1.5 cm long, translucent, persistent but becoming lacerated; leaves submerged, sessile, translucent, linear, apex obtuse, margin entire, 2.5-12 cm \times 0.2-0.5 cm; nerves 3-5 longitudinal ones with numerous fine intermediate ones. Spikes dense, 1.5-2.5 cm long, peduncles 2-7.5 cm long. Fruiting carpels 3-4 mm long.

Southern parts of the region in still to fast moving waters in streams, dams, etc. up to 5 m deep, on muddy to gravelly substrates; moderately common. Capable of forming dense growths. Flowers and fruits late winter to autumn.



Fig. 3 POTAMOGETONACEAE — A-E *Potamogeton* spp. — A₁-A₂ *P. pectinatus*, A₁ upper part of stem with inflorescences $\times \frac{2}{3}$, A₂ leaf bases showing stipular sheath with ligule $\times 4$; B *P. perfoliatus*, upper part of stem with inflorescences $\times 1$; C₁-C₂ *P. crispus*, C₁ upper part of stem with inflorescence $\times 1$, C₂ leaf base with stipular sheath $\times 4$; D *P. javanicus*, habit of plant $\times \frac{2}{3}$; E *P. tricarinatus*, habit of plant $\times \frac{2}{3}$.

5. *Potamogeton javanicus* Hassk.

Stems up to *ca* 3 m long. Stipular sheath up to 1.5 cm long, persistent but becoming lacerated; upper and lower leaves dissimilar; upper leaves petiolate, blades floating, coriaceous, narrowly elliptic, apex acute, base cuneate, 1.5–3.5 cm × 0.5–1 cm, nerves 5–7, longitudinal; lower leaves sessile, submerged, translucent, tapering at both ends, 2–10 cm × 0.05–0.3 cm. Spikes up to 1.5 cm long, dense; peduncles 1–3 cm long. Fruiting carpels 2–2.5 mm long. **Fig. 3D.**

Eastern parts of the region, in still to fast moving waters of streams, dams, etc. up to 5 m deep; moderately common. Flowers and fruits spring–summer.

6. *Potamogeton tricarinatus* F. Muell. & A. Benn. ex A. Benn.

FLOATING
PONDWEED

Potamogeton sulcatus A. Benn.; *P. similis* A. Benn.; *P. muricatus* Hagström; *P. samariformis* Hagström; *P. sessilifolius* Hagström; *P. natans* auct. Aust. non L.; *P. cheesmanii* auct. Aust. non A. Benn.

Stems sparsely branched, up to 3 m long. Stipular sheath up to 4 cm long, persistent but becoming lacerated; upper and lower leaves dissimilar; upper leaves petiolate, blades floating, coriaceous, broadly elliptic or ovate or almost round, 1.5–10 cm × 0.9–7 cm, nerves many, longitudinal; lower leaves sessile or tapering to short petiole, blades submerged, translucent, narrowly elliptic to elliptic or broadly ovate, 5–23 cm × 0.5–9 cm; foliage intermediate between upper and lower leaves sometimes present. Spikes 1.5–4.5 cm long, dense, peduncles 4–11 cm long. Fruiting carpels 2.5–4 cm long. **Fig. 3E.**

Throughout the region in still to gently flowing waters of rivers, creeks, dams etc. up to 3 m deep, on muddy bottoms, occasionally persisting on mud beside receding waters; common. Flowers and fruits spring to autumn. Has been reported as a weed in farm dams.

The above description covers a wide range of material and may include more than one taxon. Further research on the species is required.

161. ZOSTERACEAE

Monoecious or dioecious submerged marine rhizomatous perennials; stems flattened. Leaves sessile, in 2 rows, linear, sheathing at base. Flowers arranged on one side of flattened axis, at first enclosed in leaf sheaths, bracts absent; perianth absent or represented by row of bract-like lobes on each side of axis; male flowers reduced to 1-locular dorsifixed sessile anther; female flowers consisting of an ovary and two stigmas. Fruits indehiscent.

3 genera with *ca* 10 species, mostly temperate coasts of the world; 2 genera with 4 species Australia; 1 genus with 1 species south-eastern Queensland.

1. *ZOSTERA* L.

Monoecious, herbaceous, rhizomes monopodial, internodes in transverse section showing 2 vascular bundles in cortex; vegetative stems short and lateral at each node.

12 species from all but tropical areas; 3 species Australia; 1 species south-eastern Queensland.

1. *Zostera capricorni* Aschers.

EELGRASS

Rhizomes with 2 groups of roots at each node. Leaves linear, apex rounded-truncate, rarely emarginate and then only with shallow notch, 7–50 cm × 0.2–0.5 cm, main nerves 3–5. Fruits *ca* 2 mm long. **Fig. 4A.**

Widely distributed along the south-eastern Queensland coast, from low water mark down to *ca* 6 m depth, usually on sandy or muddy bottoms.

162. CYMODOCEACEAE

Dioecious marine herbs, rhizomatous. Leaves alternate or opposite or crowded at nodes, linear, with open sheath at base, sheaths mostly ligulate. Flowers minute, unisexual, axillary, solitary or in cymes; perianth of 3 small scales or absent; stamens 3; ovary superior. Fruits indehiscent.

About 5 genera with 18 species, tropical and subtropical sea coasts; 5 genera with 10 species Australia; 3 genera with 3 species south-eastern Queensland.

- | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|-----------------------|---|
| 1. Leaves subulate-terete | . | . | . | . | . | . | . | . | 1. <i>Syringodium</i> | 2 |
| Leaves flat | . | . | . | . | . | . | . | . | | |
| 2. Leaves with 3 longitudinal nerves, midrib conspicuous | . | . | . | . | . | . | . | . | 2. <i>Halodule</i> | |
| Leaves with 7 or more longitudinal nerves, midrib not conspicuous | . | . | . | . | . | . | . | . | 3. <i>Cymodocea</i> | |

1. SYRINGODIUM Kutz.

Rhizomes creeping, monopodial; stems short, erect, bearing 2 or 3 leaves at each node. Leaf sheath broad, persisting longer than leaf blade, leaving open circular scars when shed; leaf blade subulate-terete. Inflorescences cymose; male flowers consisting of stamens; female flowers consisting of 2 ovaries each with short style and 2-lobed stigma.

2 species, 1 from the Caribbean, the other from the Indo-Pacific region; 1 species Australia, occurring in south-eastern Queensland.

1. *Syringodium isoetifolium* (Aschers.) Dandy

A SEA GRASS

Cymodocea isoetifolia Aschers.

Rhizomes slender. Leaf sheath often tinged red, 1.5–4 cm long; leaf blades 7–30 cm × 0.1–0.2 cm. Male flowers on stalk *ca* 7 mm long; female flowers sessile. Fruits 3.5–4 mm long.

Found from low water mark to 6 m deep, usually on muddy or sandy substrates.

2. HALODULE Endl.

Rhizomes creeping, herbaceous, monopodial; stems short, erect, bearing 1–4 leaves at each node. Leaf sheaths persisting longer than leaf blades; leaf blades linear, nerves 3, midrib conspicuous and widened or forked at apex. Flowers solitary, terminal; male flowers consisting of 2 stamens; female flowers consisting of 2 free ovaries each with 1 long style.

6 species widely distributed along the coasts of all tropical seas; 3 species Australia; 1 species south-eastern Queensland.

1. *Halodule uninervis* (Forssk.) Aschers.

A SEA GRASS

Zostera uninervis Forssk.; *Diplanthera uninervis* (Forssk.) Aschers.

Leaf sheaths 1–3.5 cm long; leaf blades with tip with 2 lateral teeth and an obtuse median tooth in which midrib ends, margin entire, 6–15 cm × 0.03–0.35 cm, midrib conspicuous. Fruits 2–3 mm long. **Fig. 4C.**

Found from about low water mark to a depth of several metres, on mud, sand and coral debris.

3. CYMODOCEA Koenig

Rhizomes creeping, herbaceous, monopodial; stems short, erect, bearing 2–7 leaves at each node. Leaf sheaths persisting longer than leaf blades; leaf blades linear, margin entire, but serrulate or spinulose near tip, nerves 7–17, all joining intramarginal nerves at apex, cross-veins perpendicular. Flowers solitary, terminal; male flowers consisting of 2 stamens; female flowers consisting of 2 free ovaries each with short style with 2 slender stigmas.

4 species widely distributed in tropical and subtropical seas; 3 species Australia; 1 species south-eastern Queensland.

1. *Cymodocea serrulata* (R. Br.) Aschers. & Magnus

A SEA GRASS

Caulinia serrulata R. Br.

Leaf sheaths purple when fresh, broadly triangular, narrowed at base, 1.5–3 cm long; leaf blades sometimes falcate, apex obtuse, serrate to dentate with triangular teeth, margin entire, 6–15 cm \times 0.4–0.9 cm, nerves 13–17, midrib not particularly conspicuous. Fruits 7–9 mm long. **Fig. 4B.**

Usually below extreme low water mark, on sand or mud covered coral debris.

163. NAJADACEAE

Monoecious or dioecious submerged plants of fresh or brackish water; stems slender, much branched. Leaves small, subopposite or verticillate, sessile, sheathing at base, linear, entire or toothed. Flowers unisexual, very small, borne at base of branches; male flowers usually sessile, included in a spathe, perianth 2-lipped, stamens 1; female flowers with perianth absent or membranous and inconspicuous, carpels 1. Fruits usually embraced by leaf sheath, indehiscent.

1 genus with 35 species, widely distributed in temperate and tropical regions; 1 genus with *ca* 5 species Australia; 2 species south-eastern Queensland.

1. NAJAS L.

Characters as for the family.

1. Leaf sheaths with noticeable auricles; leaf blades minutely toothed

Leaf sheaths without auricles; leaf blades prominently toothed . . .

1. *N. tenuifolia*2. *N. marina***1. *Najas tenuifolia* R. Br.**

WATER NYMPH

Leaf sheaths open but stem-clasping, short, produced on each side into narrowly ovate, ciliate-toothed auricle; leaf blades narrowly linear, with numerous minute teeth along margin, up to 3–5 cm \times *ca* 0.1 cm. Fruits 2–4 mm long. **Fig. 4D.**

In fresh, or sometimes brackish, still to slow moving water at depths up to *ca* 60 cm.

Queensland material has been referred to *N. graminea* Delile. However in the absence of a modern, detailed study of the genus it seems best to retain the widely used name *N. tenuifolia* for the present.

2. *Najas marina* L.*Najas major* All.

Stems often bearing triangular teeth. Leaf sheaths short, broad, often toothed; leaf blades linear, margin usually bearing prominent curved teeth, up to 4 cm \times 0.4 cm. Fruits up to 8 mm long. **Fig. 4E.**

Known in the region only from the Gold Coast, collected once in fresh water lagoons between Currumbin and Burleigh and once from Coolangatta.

164. RUPPIACEAE

Aquatic herbs of saline waters. Leaves opposite or alternate, filiform, sheathing at base. Flowers bisexual, small, few, arranged in terminal spikes at first enclosed in sheathing leaf base, later \pm elongated, bracts absent; perianth absent; stamens 2; carpels 4 or more, stigmas peltate or umbonate. Fruits indehiscent on long stipes.

1 genus with *ca* 6 species in salt marshes throughout temperate and subtropical regions; 4 species Australia; 1 species south-eastern Queensland.



Fig. 4 A ZOSTERACEAE — A₁–A₃ *Zostera capricorni*, A₁ part of plant showing habit x 1, A₂ upper part of leaf x 6, A₃ fruit x 3; B–C CYMODOCEACEAE — B₁–B₂ *Cymodocea serrulata*, B₁ part of plant showing habit x 3/4, B₂ upper part of leaf x 3; C₁–C₃ *Halodule uninervis*, C₁ part of plant showing habit x 1, C₂–C₃ upper part of leaf x 6; D–E NAJADACEAE — D–E *Najas* spp. — D₁–D₃ *N. tenuifolia*, D₁ portion of stem x 1, D₂ portion of leaf showing teeth x 6, D₃ leaf sheath x 6; E *N. marina*, portion of stem x 1; F RUPPIACEAE — *Ruppia maritima*, portion of stem with inflorescence x 1.

1. RUPPIA L.

Characters as for the family.

1. ***Ruppia maritima* L.**

SEA TASSEL

Leaves sessile, sheathed below, filiform, 2–15 cm × *ca* 0.1 cm. Peduncles up to *ca* 5 cm long; flowers 2 per spike; carpels 2–5, initially subsessile, stipe lengthening as carpel matures, finally 0.3–1.5 cm long. Fruiting carpels 2–4 mm long, beak *ca* 0.5 mm long. **Fig. 4F.**

Known from a few localities in the region, mostly in brackish to strongly saline waters of swamps, estuaries, sometimes in fresh water, at depths of up to 2 m.

165. LILIACEAE

Perennial herbs, rarely annual, shoots annual or perennial, arising from bulbs, corms, tubers or rhizomes, sometimes shrubs or climbers. Leaves alternate or opposite (not in Australia) or reduced to scales and then the stems with cladodes. Flowers actinomorphic or zygomorphic in terminal or axillary spikes, racemes, corymbs, umbels or panicles, rarely solitary; perianth of 6 segments in 2 series, free or fused; stamens mostly 3 or 6, rarely 4 or 8–14, anthers 2-locular, dehiscing by slits or apical pores; ovary superior, 1- or 3-locular, rarely 4–7-locular, ovules 1–many per loculus, styles 1 or 3, stigmas 2- or 3-lobed or capitate or stigmas 3–7. Fruits berries or capsules, or dry and indehiscent.

About 280 genera with *ca* 4000 species worldwide in tropical to temperate regions; *ca* 57 genera with *ca* 241 species Australia; 25 genera with 49 species south-eastern Queensland.

1. Leaves succulent, with marginal teeth 3–5 mm long	1. <i>Aloe</i>	2
Leaves not succulent, or if succulent then without marginal teeth		
2. Fruits berries		3
Fruits capsules		6
3. Flowers unisexual; leaves reduced to scales subtending leaf-like cladodes	2. <i>Asparagus</i>	
Flowers bisexual; leaves not reduced to scales or reduced to scales subtending leaf-like cladodes		4
4. Perianth whitish or pink, segments 2–4 mm long	3. <i>Protasparagus</i>	
Perianth blue to violet or if white or pink then perianth segments 5 mm or more long		4
5. Leaves elliptic to narrowly ovate; veins more than 1	4. <i>Drymophila</i>	
Leaves ± linear; veins 1	5. <i>Dianella</i>	
6. Filaments all hairy or 3 hairy and 3 glabrous		7
Filaments all glabrous (note Dichopogon has glabrous filaments but hairy anther appendages)		11
7. Flowers yellow		8
Flowers white or mauve to blue		9
8. Flowers in racemes on single stems; perianth not spirally twisted after flowering	6. <i>Bulbine</i>	
Flowers in umbels on often branched stems; perianth spirally twisted after flowering	7. <i>Tricoryne</i>	
9. Leaves basal	8. <i>Arthropodium</i>	
Leaves cauline		10
10. Flowers nodding; filaments glabrous below middle, matted hairy towards apex	9. <i>Stypandra</i>	
Flowers erect; filaments glabrous at apex and base, papillate at middle	10. <i>Thelionema</i>	

11. Perianths spirally twisted after flowering	11. <i>Caesia</i>	12
Perianths not spirally twisted after flowering		
12. Perianths more than 10 cm long	12. <i>Lilium</i>	13
Perianths less than 10 cm long		
13. Inflorescences terminal umbels		14
Inflorescences other than umbels or flowers solitary or if umbels then axillary		19
14. Perianths mauve, margins fimbriate	13. <i>Thysanotus</i>	15
Perianths whitish or pinkish, margins entire		
15. Plants with bulbs		16
Plants without bulbs		17
16. Plants usually with onion or garlic odour when bruised; flowers on flaccid or prostrate scapes (in south-eastern Queensland)	14. <i>Allium</i>	
Plants without onion or garlic odour; flowers on erect stems	15. <i>Nothoscordum</i>	
17. Leaves linear but not \pm terete, basal and cauline	16. <i>Burchardia</i>	18
Leaves \pm terete, either basal or cauline		
18. Leaves all cauline	17. <i>Laxmannia</i>	
Leaves all basal	18. <i>Sowerbaea</i>	
19. Plants with climbing stems; flowers solitary axillary	19. <i>Gloriosa</i>	20
Plants erect; flowers not solitary axillary		
20. Flowers in axillary umbel-like cymes	20. <i>Tripladenia</i>	21
Flowers in terminal inflorescences		
21. Anthers with hairy appendages; perianth purple	21. <i>Dichopogon</i>	22
Anthers without hairy appendages; perianth not purple		
22. Inflorescences panicles; leaves tubular, hollow	22. <i>Asphodelus</i>	23
Inflorescences simple spikes or racemes or flowers solitary; leaves not tubular, not hollow		
23. Perianth more than 2 cm long; capsules up to 6 cm long	23. <i>Blandfordia</i>	24
Perianth less than 2 cm long; capsules less than 2 cm long		
24. Perianth red or reddish brown; nectaries absent	24. <i>Iphigenia</i>	
Perianth white, pinkish or greenish with conspicuous nectaries	25. <i>Wurmbea</i>	

1. ALOE L.

Stems short, roots fibrous. Leaves in rosettes, sessile, succulent, margin usually sinuate-dentate, rarely entire. Inflorescences axillary, simple or branched racemes; flowers bisexual, zygomorphic; sepals 3, free or connate into tube; petals 3, usually adnate to sepals for $\frac{1}{2}$ their length; stamens 6; ovary superior, 3-locular, ovules numerous, style 1, filiform. Fruits capsules.

About 330 species Africa, Madagascar and Arabia, many species cultivated mostly as ornamentals; 3 species naturalized Australia, all occurring in south-eastern Queensland.

Placed by some authors in Aloaceae.

1. Leaves less than 20 cm long	1. <i>A. saponaria</i>	2
Leaves 30 cm or more long		
2. Plants with very short stems; leaves spotted, 30–40 cm long	2. <i>A. parvibracteata</i>	
Plants with long stems; leaves not spotted; spotted, 50–60 cm long	3. <i>A. arborescens</i>	

1. **Aloe saponaria* (Aiton) Haw.

Stems usually short, suckering and forming clumps. Leaves 12–16, green with white spots, broadly ovate, apex acute and often recurved, margin with teeth 4–5 mm long. Inflorescences simple or with up to 3 branches, 40–80 cm tall, branches subtended by bracts *ca* 1 cm long, each branch terminated by a condensed raceme 8–10 cm × 10–14 cm; perianth orange-pink, 3.5–4.5 cm long, sepals and petals cohering for part of their length. Fruits not seen.

Two varieties occur in the region:

- | | | | | | | | | | |
|-----------------------------|---|---|---|---|---|---|---|---|--------------------------|
| 1. Pedicels 3.5–4.5 cm long | . | . | . | . | . | . | . | . | <i>A. saponaria</i> var. |
| | | | | | | | | | <i>saponaria</i> |
| Pedicels 1.2–2.5 cm long | . | . | . | . | . | . | . | . | <i>A. saponaria</i> var. |
| | | | | | | | | | <i>ficksburgensis</i> |

Both subspecies are native of southern Africa. *A. saponaria* var. *saponaria* has escaped from cultivation in a few places in the region. *A. saponaria* var. *ficksburgensis* Reynolds (Fig. 5A.) has been collected apparently naturalized at Murgon in the Burnett district, at the site of an abandoned homestead.

2. **Aloe parvibracteata* Schönl.

Stems short, suckering and forming clumps. Leaves 10–15, green to brownish green with white spots, narrowly ovate, apex acute, margin with teeth 3–5 mm long. Inflorescences with 3–6 branches, 1–1.5 m tall, branches subtended by bracts 1.5–2 cm long, each branch terminated by raceme 7–17 cm × 6–8 cm, pedicels 0.8–1.4 cm long; perianth orange-pink, 3–3.5 cm long, sepals and petals cohering for part of their length. Capsules 3.5–4 cm long.

Native of southern Africa; cultivated as an ornamental, escaped from cultivation in a few places in the region.

3. **Aloe arborescens* Miller

Stems long, whole plant up to 3 m tall. Leaves many, falcately deflexed, dull green to grey-green, apex narrowed, margin with teeth 3–5 mm long. Inflorescence simple, racemes 20–30 cm long on scape up to *ca* 60 cm tall, bracts *ca* 2 cm long, pedicels 3.5–4 cm long; perianth scarlet, *ca* 4 cm long, sepals and petals not cohering. Fruit not seen.

Native of southern Africa; cultivated as an ornamental, collected, apparently as a garden escape, from a single locality in the Moreton district.

2. ASPARAGUS L.

Dioecious; stems arising from short rhizome, erect or climbing, much branched. Leaves reduced to scales which subtend solitary or clustered cladodes. Flowers unisexual, axillary, solitary, or clustered in axils or in axillary racemes; perianth actinomorphic, sepals and petals free; stamens 6, anthers dehiscent by slits; ovary superior, 3-locular, style 1, stigma capitate or minutely 3-lobed. Fruits berries.

About 60 species, Africa, Asia and Europe; 1 species naturalized Australia, occurring in south-eastern Queensland.

Placed by some authors in Asparagaceae.

1. **Asparagus officinalis* L.**ASPARAGUS**

Stems erect, up to *ca* 1.5 m tall. Cladodes sessile, 3 unequal ones in each leaf scale axil, filiform, 0.5–3 cm × 0.05–0.1 cm. Flowers solitary, greenish white, pedicels 0.6–1.5 cm long; male flowers with sepals and petals 4–7 mm long, stamens 4–6 mm long; female flowers with sepals and petals similar to males, ovary 2–3 mm long, style 1–2 mm long. Berries red, 8–10 mm diameter.

Native of Europe; cultivated for its edible shoots, apparently naturalized in a few places in the region.

Native of southern Africa; cultivated as an ornamental, naturalized in several places in the region. Flowers mainly spring.

5. ****Protasparagus plumosus* (Baker) Oberm.** CLIMBING ASPARAGUS FERN

Asparagus plumosus Baker; *Asparagus setaceus* (Kunth) Jessop

Climber; roots fibrous; stems up to 5 m long. Cladodes several per axil, slender, apex apiculate, 4–7 mm × *ca* 0.5 mm; soft axillary spines present. Flowers solitary or paired, terminal on short lateral branches, pedicels 1–2.5 mm long; sepals and petals whitish, 3–4 mm long; stamens 2.5–3.5 mm long; style 0.5–1 mm long. Berries black, 4–5 mm diameter.

Native of southern Africa; cultivated as an ornamental, naturalized in a few places in the region. Flowers spring to autumn.

4. **DRYMOPHILA R. Br.**

Perennials, rhizomatous; stems erect, branched or simple. Leaves alternate, distichous, reduced to scales on lower stem, petiolate. Flowers pendulous, solitary axillary or in axillary few-flowered cymes; perianth actinomorphic, sepals and petals free; stamens 6, free, anthers dehiscent by slits; ovary superior, 1-, or 3- or 4-locular, styles 3 or 4, stigmas 3–4. Fruits berries.

2 species endemic in eastern Australia; 1 species south-eastern Queensland.

Placed by some authors in Luzuriagaceae.

1. ***Drymophila moorei* Baker**

Stems simple, up to 30 cm tall. Leaves with petioles 0.5–1.5 mm long; blades elliptic to narrowly ovate, apex acute, 3–6 cm × 1–2 cm. Flowers white to pale pink, pedicels 0.8–1.2 cm long; sepals 5–7 mm long; petals 6–8 mm long; stamens 3–4 mm long; ovary glabrous, 3- or 4-locular, 2–4 mm long; styles 1–1.5 mm long. Berries orange-yellow, 0.8–1.5 cm long. **Fig. 5B.**

Known from a few areas along the McPherson Ra. in southern Moreton district. Flowers spring–summer.

5. **DIANELLA Lam. ex Juss.**

Sympodial rhizomatous perennials, herbaceous or shrub-like; roots fibrous, fleshy-fibrous or tuberous; stems elongated or very short, scaly and/or leafy. Leaves linear. Inflorescences compound cymes, partially bracteate; flowers bisexual, pedicellate, in condensed or expanded raceme-like cymules; perianth petaloid, segments 6, in 2 subequal whorls, free, persistent but withering; stamens 6, filaments glabrous, with distal swelling; ovary superior, usually 3-locular, style filiform, stigma minute. Fruits succulent berries, depressed spherical to obloid; seeds biconvex, usually black and shiny.

25–30 species south-eastern Africa, south-eastern Asia, Hawaii, South Pacific islands, Australia and New Zealand; 15 species Australia, 11 endemic; 8 species south-eastern Queensland.

Placed by some authors in Phormiaceae.

All species are known as **BLUE FLAX LILIES**.

- | | |
|--|---|
| 1. Stems short, usually less than 15 cm long; leaves mostly basal with lowest 1–5 sometimes scale-like; leaf sheaths rounded, ridged or sharply keeled | 2 |
| Stems variously elongated, up to 120 cm long, with or without scales below leaves, the scales spaced along or mostly towards top of stem; leaf sheaths strongly conduplicate and broadly and acutely keeled | 7 |
| 2. Leaf sheaths distinct from blades, conduplicate, acutely keeled; blades with veins raised and touching one another on lower surface; margin smooth or occasionally irregularly toothed, recurved to revolute, rarely straight | 3 |
| Leaf sheaths not clearly distinguished from blades, rounded, ridged or shallowly keeled; blades with veins raised but not touching one another on lower surface; margin smooth to serrulate, flat to recurved, sometimes revolute when dried | 4 |

3. Inflorescences irregular in outline, evenly expanded; flowers less than 1.3 cm across; anthers up to 2 mm long; ovules 2 per loculus; leaf blades long and distally flaccid 1. *D. brevipedunculata*
 Inflorescences ovoid to conical in outline, interrupted; flowers more than 1.2 cm across; anthers more than 2 mm long; ovules more than 3 per loculus; leaf blades short to long and \pm stiffly erect, spreading or outwardly curving 2. *D. revoluta*
4. Leaf blades usually less than 4.5 mm wide; internodes of mature cymules elongated, usually more than 1 cm long; pedicels 1.5–4 times perianth length 3. *D. rara*
 Leaf blades usually more than 5 mm wide; internodes of mature cymules elongated or contracted; pedicels usually less than 1.5 times perianth length 5
5. Leaf sheaths \pm completely closed distally where \pm narrowly biconvex-elliptic in transverse section; blades 0.4–1.2 cm wide, with several longitudinal nerves prominent; seeds finely pustulate 4. *D. nervosa*
 Leaf sheaths partly closed distally where crescent-, V- or Y-shaped in transverse section; blades 0.2–2.5 cm wide, with midrib more prominent than other nerves; seeds smooth or with minutely rounded elevations 6
6. Leaf blades usually strongly decurving, 0.6–1.8 cm wide; inflorescences \pm hemispherical to ovoid in outline with peduncles oblique, the flowers somewhat crowded; bracts subtending lowest flowering branches broadly obtuse; petals mostly 5-nerved 5. *D. crinoides*
 Leaf blades erect or ascending but often flaccidly drooping distally, 0.2–2.5 cm wide; inflorescences ovoid to obovoid or narrowly cylindrical in outline with peduncles erect, the flowers well spaced; bracts subtending lowest flowering branches acute; petals mostly 3-nerved 6. *D. longifolia*
7. Leaf sheaths partly closed distally where V- or Y- shaped in transverse section 7. *D. caerulea*
 Leaf sheaths \pm completely closed distally where \pm biconvex in transverse section 8
8. Nerves on lower surface of leaf blades raised and touching one another; margin of blades and midribs on lower surface of blades usually smooth, occasionally irregularly toothed; anthers pale brown to almost black 2. *D. revoluta*
 Nerves on lower surface of leaf blades raised but not touching one another; margin of blades and midrib on lower surface of blades smooth or serrulate-scabrous throughout; anthers yellow 9
9. Axes of inflorescences reduced, primary branching absent or poorly developed; inflorescences spreading to decurved, rarely exceeding foliage; margin of leaf blades usually smooth 8. *D. congesta*
 Axes of inflorescences well developed; inflorescences erect, conspicuously exceeding foliage; margin of leaf blades serrulate-scabrous throughout 7. *D. caerulea*

1. *Dianella brevipedunculata* R. Henderson

Tufted, up to 50 cm tall, up to 30 cm wide at base; roots fleshy-fibrous. Leaves 50–100 cm long; sheaths wholly closed at apex; blades 1–2 cm wide. Inflorescences wholly within foliage; cymules 1–6-flowered, pedicels up to 1.5 cm long; perianth purple, 4–6 mm long; filament swelling bright yellow, anthers dark brown, 1.5–2 mm long; ovules 2 per loculus. Berries 0.5–1.2 cm long.

Widespread but sporadic throughout the region, from sea level near the sea to ca 900 m altitude on the Great Dividing Ra., in open forest or woodland. Flowers late spring.

2. *Dianella revoluta* R. Br.

Tufted or mat-forming, up to 1 m tall, up to 1.5 m wide at base; roots fibrous. Leaves 15–85 cm long; sheaths wholly closed at apex. Inflorescences from wholly within to wholly exceeding foliage; cymules 2–9-flowered, pedicels 0.5–3.5 cm long; perianth mid-

to dark blue or violet, 6–10 mm long; filament swelling bright yellow, anthers pale brown to almost black, 2.5–4.5 mm long; ovules more than 3 per loculus. Berries 4–10 mm long.

Three varieties occur in the region:

1. Inner perianth segments 3-nerved; berries white or pale blue; leaf blades less than 0.4 cm wide *D. revoluta* var. *minor*
 Inner perianth segments 5-nerved; berries mid to dark blue; leaf blades 0.4–1.2 cm wide 2
2. Margins of leaf blades recurving, irregularly toothed, teeth cilia-like with tips up to ca 1 mm long *D. revoluta* var. *vinosa*
 Margins of leaf blades revolute and virtually smooth *D. revoluta* var. *revoluta*

Dianella revoluta* var. *revoluta (Fig. 5D.), a very variable taxon, occurs widely and commonly throughout the region often on dry shallow soils in open forest or woodland. ***D. revoluta* var. *minor*** R. Henderson is known only from the Murgon-Wondai area of the Burnett district in eucalypt open forest. ***D. revoluta* var. *vinosa*** R. Henderson occurs sporadically in southern Darling Downs district including the granite-soils area near Stanthorpe. All flower in summer.

3. *Dianella rara* R. Br.

Arthropodium dianellaceum F. Muell.

Tufted, up to 80 cm tall, 0.5–1.5 cm wide at base; roots tuberous. Leaves 15–35 cm long; sheaths ± channelled at apex; blades 2–5 mm wide. Inflorescences exceeding foliage; cymules 5–15-flowered, pedicels 1.5–3 cm long; perianth pale blue, 7–8.5 mm long; filament swelling orange, anthers pale yellow, 3–4.5 mm long; ovules 4 per loculus. Berries 2.5–4 mm long.

Moreton district in open forests; rare. Flowers spring–summer.

4. *Dianella nervosa* R. Henderson

Tufted, up to 70 cm tall, less than 2 cm wide at base; roots fleshy-fibrous. Leaves 0.2–1.1 m long; sheaths ± completely closed at apex; blades 0.4–1.2 cm wide. Inflorescences exceeding foliage; cymules 2–15-flowered, pedicels 0.8–1.4 cm long; perianth pale to sky-blue, 7–10 mm long; filament swelling yellow, anthers tan to dark brown, 3–4.5 mm long; ovules 4–6 per loculus. Berries 6–9 mm long.

Known from a few mountains in Moreton and Wide Bay districts; rare. Flowers spring.

5. *Dianella crinoides* R. Henderson

Tufted, up to 80 cm tall, up to 20 cm wide at base; roots fleshy-fibrous. Leaves 20–70 cm long, out curving; sheath slightly closed and V-shaped in transverse section at apex; blades 0.6–1.8 cm wide. Inflorescences exceeding foliage; cymules 5–15-flowered, pedicels 5–7.5 mm long; perianth sky- to dark blue, 7–9.5 mm long; filament swelling orange-yellow, anthers pale yellow, 3–4 mm long; ovules 6 per loculus. Berries 6–8 mm long.

Maritime habitats throughout the region on sands or sandy soils near rocks; not common. Flowers spring–summer.

6. *Dianella longifolia* R. Br.

Dianella laevis R. Br.

Tufted, up to 1.5 m tall, 1–60 cm wide at base; roots fleshy-fibrous or tuberous. Leaves 20–80 cm long; sheaths slightly to moderately closed and V- to Y-shaped in transverse section at apex; blades 0.2–2.5 cm wide. Inflorescences exceeding foliage; cymules 2–32-flowered, pedicels 1–2 cm long; perianth blue or yellow-blue to white, 6–10 mm long; filament swelling orange; anthers pale yellow, 3–5 mm long; ovules 4–8 per loculus. Berries 3–7 mm long.

Five varieties occur in the region:

1. Leaf blades less than 0.4 cm wide; roots tuberous *D. longifolia* var. *stenophylla*
 Leaf blades 0.4–2.5 cm wide; roots fleshy-fibrous 2
2. Plants forming tufts up to 5 cm across at base; leaf blades 0.4–1.2 cm wide 3

- Plants forming tufts 10–60 cm across at base; leaf blades 0.5–2.5 cm wide 4
3. Cymules 2–12-flowered; margin and midrib of leaf blades smooth or scabrid *D. longifolia* var. *longifolia*
- Cymules 8–32-flowered; margin and midrib of leaf blades virtually smooth *D. longifolia* var. *stupata*
4. Cymules 3–8-flowered; flowers usually greenish white, rarely pale blue; leaf blades grey-green to yellow-green *D. longifolia* var. *grandis*
- Cymules 6–22-flowered; flowers mid-blue; leaf blades light bright green *D. longifolia* var. *surculosa*

Dianella longifolia* var. *longifolia, a vary variable taxon, occurs widely throughout the region on a variety of loam or clay soil types, usually in eucalypt open forest; common. ***D. longifolia* var. *stupata*** R. Henderson occurs sporadically throughout the Darling Downs and Burnett districts, on clay soils in open forest or woodland. ***D. longifolia* var. *grandis*** R. Henderson occurs in the Darling Downs and Burnett districts, on shallow sandy or loam soils in open forest; not common. ***D. longifolia* var. *surculosa*** R. Henderson occurs in a few localities in the Moreton and Wide Bay districts, on swampy sandy soils close to the coast; not common. ***D. longifolia* var. *stenophylla*** Domin occurs throughout the region in forest or woodland communities, especially on sandy soils of the granite belt in the Darling Downs district; not common. All flower spring–summer.

7. *Dianella caerulea* Sims

Tufted or mat-forming, up to 1.8 m tall, up to ca 2 m wide at base; roots fibrous. Leaves 10–75 cm long; sheaths mostly to almost wholly closed, Y-shaped to narrowly biconvex in transverse section at apex; blades 0.3–2.5 cm wide. Inflorescences exceeding foliage; cymules 3–25-flowered, pedicels 3–10 mm long; perianth dark blue, green-blue or bronze-blue to green-white, 0.7–1.2 cm long; filament swelling yellow, anthers pale yellow-brown, 3–5 mm long; ovules 6–12 per loculus. Berries 0.7–1.2 cm long.

Six varieties occur in the region:

1. Leaf sheaths $\frac{1}{3}$ – $\frac{2}{3}$ closed at apex, there \pm Y-shaped in transverse section 2
- Leaf sheaths more than $\frac{2}{3}$ closed at apex, there \pm biconvex in transverse section 3
2. Stems conspicuously elongated, scaly for most of their length; extravaginal shoots developing distally, at least with age; flowers white or pale blue *D. caerulea* var. *producta*
- Stems condensed or shortly elongated, scales few proximally; extravaginal shoots absent distally; flowers blue *D. caerulea* var. *caerulea*
3. Stems scaly for most of their length; extravaginal shoots developing distally; flowers pale to sky-blue *D. caerulea* var. *assera*
- Stems leafy for most of their length; extravaginal shoots never developing distally 4
4. Plants forming mats up to ca 2 m across at base; mature leaves \pm equal in size for several nodes near middle of stem; flowers dark bronze-green to blue-green *D. caerulea* var. *petasmatodes*
- Plants forming tufts usually less than 0.5 m across at base; mature leaves increasing in size upwards; flowers pale to dark blue 5
5. Aerial shoots touching or close to one another, up to ca 1.3 m tall *D. caerulea* var. *vannata*
- Aerial shoots near to one another or up to 30 cm apart, up to ca 0.5 m tall *D. caerulea* var. *protensa*

Dianella caerulea* var. *caerulea occurs in southern Moreton and south-eastern Darling Downs districts, on comparatively well drained soils in eucalypt open forest; not common. ***D. caerulea* var. *producta*** R. Henderson occurs on mountains in the Moreton district in open forest, but can be found close to sea level in the Burleigh Heads National Park; common. ***D. caerulea* var. *assera*** R. Henderson usually occurs at higher altitudes in eastern parts of the region, often associated with rainforest; not common. ***D. caerulea* var. *petasmatodes*** R. Henderson occurs on coastal ranges in the region, in eucalypt open forest or rainforest margins; not common. ***D. caerulea* var. *vannata*** R. Henderson is widespread from sea level to mountains throughout the

region; common. *D. caerulea* var. *protensa* R. Henderson occurs along the coast of the region, on sandy soils in eucalypt open forest and heath. All flower mainly in spring–summer but flowers can be found on many throughout the year.

8. *Dianella congesta* R. Br.

Dianella caerulea var. *congesta* (R. Br.) F. M. Bailey

Tufted or mat-forming up to 1 m tall, up to 20 m or more wide at base; roots fibrous. Leaves 10–45 cm long; sheaths \pm completely closed at apex; blades 1–1.5 cm wide. Inflorescences \pm within foliage, axis decurving; cymules 2–8-flowered, pedicels 5–9 mm long; perianth dark blue, 7–8.5 mm long; filament swelling bright yellow, anthers yellow-brown, 2.5–3.5 mm long; ovules 4–8 per loculus. Berries 0.6–1.2 cm long.

Widespread in maritime areas of the region, particularly in sand-dune communities. Flowers throughout the year. It has been used as a horticultural subject by landscapers about Brisbane. The mat-forming characteristics make it suitable as a sand stabilizer.

6. BULBINE Wolf

Perennial or annual herbs, sometimes with rhizomes or tubers; roots fibrous. Leaves basal, fleshy, \pm linear, often sheathing at base. Inflorescences scapose racemes, bracts membranous; perianth segments 6, \pm free, \pm equal; stamens 6, filaments slender, all or inner 3 bearded in upper half; ovary superior, 3-locular, ovules 2–8 per loculus, style filiform. Fruits capsules.

About 50 species, Africa and Australia; 5 species Australia; 4 species south-eastern Queensland.

Placed by some authors in Asphodelaceae.

- | | | | | | | |
|--|---|---|---|---|--------------------------|---|
| 1. Perianth segments usually 3–7 mm long; plants usually annual | . | . | . | . | . | 2 |
| Perianth segments more than 7 mm long; plants perennial | . | . | . | . | . | 3 |
| 2. All stamens bearded; seeds with membranous wing; capsules 4–9 mm long | | | | | 1. <i>B. alata</i> | |
| Inner 3 stamens bearded, outer 3 stamens glabrous; seeds not winged; capsules 2–4.5 mm long | | | | | 2. <i>B. semibarbata</i> | |
| 3. Scapes sharply angular, procumbent and flexuose; styles erect or down-curved away from anthers; seeds heavily ridged | | | | | 3. <i>B. vagans</i> | |
| Scapes terete or obscurely angular, erect; styles decumbent along perianth segments; seeds smooth, slightly tuberculate or slightly ridged | | | | | 4. <i>B. bulbosa</i> | |

1. *Bulbine alata* Baijnath

NATIVE LEEK

Annual, up to *ca* 60 cm tall. Leaves succulent, glaucous, linear-subulate, 5–20(–30) cm long, glabrous. Scapes several–many, terete, erect but often flexuose towards apex, pedicels erect, 0.4–1.7 cm long; perianth segments yellow, 3–5 mm long; stamens 3 long and 3 short, \pm erect, filaments all bearded, surrounding style, anthers yellow, appearing dorsifixed; ovules 2 per loculus, style erect, 1–1.5 mm long. Capsules 4–9 mm long; seeds with membranous wing.

Darling Downs district in heavy soils. Flowers spring–summer.

2. *Bulbine semibarbata* (R. Br.) Haw.

Anthericum semibarbatum R. Br.; *Bulbinopsis semibarbata* (R. Br.) Borzi; *Bulbine semibarbata* forma *gracilescens* Domin

Annual, rarely biennial, up to *ca* 60 cm tall. Leaves green, rarely glaucous, up to *ca* 30 cm long, glabrous. Scapes several–many, terete, erect, pedicels erect or sometimes recurved, 0.8–2.5 cm long; perianth segments yellow, 3–7 mm long; 3 inner stamens long and bearded near apex of filament, 3 outer ones short and glabrous, anthers reddish, orange or yellow-brown, appearing dorsifixed; ovules 2 per loculus, style usually inclined in different direction to stamens, 1–1.5 mm long. Capsules 2–4.5 mm long; seeds not winged.

Known from a few localities in the Moreton and Darling Downs districts, often on sandy soils or in rocky areas, including granite areas. Flowers spring–summer.

3. *Bulbine vagans* E. M. Watson

Perennial, tuber absent, up to *ca* 60 cm tall. Leaves shiny, up to *ca* 35 cm long, glabrous. Scapes many, sharply angular, at first erect becoming procumbent and flexuose, pedicels 1.8–2.4 cm long; perianth segments yellow, 0.8–1.3 cm long; stamens 3 long and 3 short, bunched to one side, all filaments bearded, anthers yellow, \pm basifixed; ovules 2–4 per loculus, style erect or down-curved away from anthers, 2–3 mm long. Capsules 3–5 mm long; seeds distinctly ridged. **Fig. 5E.**

Known from the mountains and ranges of southern Moreton district and from mountains along the Great Dividing Ra. as far north as the Bunya Mts. Flowers spring.

4. *Bulbine bulbosa* (R. Br.) Haw.

Anthericum bulbosum R. Br.; *Bulbinopsis bulbosa* (R. Br.) Borzi

Perennial up to *ca* 60 cm tall; bulb-shaped tuber usually present; roots thickened. Leaves green, rarely glaucous, up to *ca* 40 cm long, glabrous. Scapes usually 1 or 2, terete, erect, pedicels 1–2.8 cm long; perianth segments yellow, 0.9–2.2 cm long; stamens all \pm equal, all filaments bearded; anthers yellow, \pm basifixed; ovules 3–8 per loculus, style decumbent, 2.5–9 mm long. Capsules 4–7 mm long; seeds smooth, slightly tuberculate or slightly ridged.

Widespread in the Darling Downs district, usually in open woodland, also recorded from Crows Nest in western Moreton district. Flowers spring–summer.

7. TRICORYNE R. Br.

Perennial herbs, shortly rhizomatous; roots fibrous. Leaves basal, narrowly ovate or linear or reduced to scales. Inflorescences terminal umbels; flowers bisexual, actinomorphic; perianth segments free, spirally twisted after anthesis, sepals 3, petals 3; stamens 6, attached at base of perianth, filaments with tuft of hairs below anther, anthers dehiscing by slits; ovary superior, 3-lobed, 3-locular, ovules few per loculus, styles filiform, stigmas simple. Fruits schizocarps.

7 species Australia with 1 extending to New Guinea; 3 species south-eastern Queensland.

Placed by some authors in Anthericaceae.

- | | | | | | | | |
|--|---|---|---|---|---|---|----------------------------|
| 1. Flowering axes flattened or winged | . | . | . | . | . | . | 1. <i>T. anceps</i> subsp. |
| | | | | | | | <i>ptero caulon</i> |
| Flowering axes not flattened nor winged | . | . | . | . | . | . | 2 |
| 2. Plants densely hispid | . | . | . | . | . | . | 2. <i>T. muricata</i> |
| Plants glabrous or with scabrous hairs at base | . | . | . | . | . | . | 3. <i>T. elatior</i> |

1. *Tricoryne anceps* R. Br. subsp. *ptero caulon* (Baker) Thongpukdee

Tricoryne pterocaulon Baker

Plants up to 70 cm tall. Leaves grass-like, 2–3 cm \times 0.2–0.4 cm, glabrous. Branches of flowering axis flattened or winged, glabrous, mostly 4–5 mm wide, bracts 1.5–3 mm long, umbels mostly 3–15-flowered, pedicels 1.5–8 mm long; perianth yellow, sepals 0.6–1.2 cm long, petals 0.6–1.1 cm long; filaments *ca* 4 mm long. Fruits 5–7 mm long, strongly ribbed when dry. **Fig. 5F.**

Widespread in eastern Moreton and Wide Bay districts, usually in sandy soil. Flowers spring.

2. *Tricoryne muricata* Baker

Tricoryne anceps R. Br. var. *muricata* (Baker) Domin

Plants up to *ca* 30 cm tall. Leaves linear, 1.2–7.5 cm \times 0.2–0.5 cm, \pm hispid. Flowering branches striate or angular, hispid, bracts 1–2 mm long, umbels mostly 3–12-flowered, pedicels 2–5 mm long; perianth yellow, sepals 6–7 mm long, petals *ca* 8 mm long; filaments *ca* 4 mm long. Fruits *ca* 3–4 mm long, reticulate.

Known from a few places in eastern parts of the region; rare. Flowers spring.

Further research may show that *Tricoryne muricata* is just a hairy form of *T. elatior* and that it may not warrant even varietal status.



Fig. 5 LILIACEAE — A *Aloe saponaria* var. *ficksburgensis*, part of inflorescence x 1; B *Dryomphila moorei*, flower x 2; C *Protasparagus densiflorus*, part of stem showing cladodes and fruits x $\frac{1}{2}$; D₁–D₂ *Dianella revoluta* var. *revoluta*, D₁ part of inflorescence x 1, D₂ flower x 2; E *Bulbine vagans*, flower x 2; F₁–F₂ *Tricoryne anceps* subsp. *pterocaulon*, F₁ part of flowering plant x $\frac{1}{2}$, F₂ stamen x 9.

3. *Tricoryne elatior* R. Br.

Tricoryne elatior var. *typica* Domin; *T. elatior* var. *decipiens* Domin; *T. elatior* var. *muriculata* Domin

Plants up to 1 m tall. Leaves linear, 5–10 cm × 0.2–0.4 cm, glabrous. Flowering branches terete, slightly striate, glabrous, bracts 3–8 mm long, umbels mostly 2–10-flowered, occasionally more, pedicels 2.5–6 mm long; perianth yellow, sepals 0.6–1.4 cm long, petals 5–10 mm long; filaments 3–5 mm long. Fruits 4–6 mm long, slightly reticulate.

Widespread in the region, usually in sandy soils; common in eastern parts of the region. Flowers spring.

8. *ARTHROPODIUM* R. Br.

Perennial herbs; roots with tubers. Leaves prostrate to erect. Inflorescences racemes or panicles, scapose; flowers 1–9 together, bisexual, actinomorphic, pedicels spreading to nodding; perianth segments 6, free, in 2 series; stamens 6, anthers dehiscing by longitudinal slits, filaments hirsute; ovary superior, 3-locular, ovules 2–5 per loculus. Fruits capsules.

8 species Madagascar, Australia, New Caledonia and New Zealand; 4 species Australia; 2 species south-eastern Queensland.

Placed by some authors in Anthericaceae.

- | | | | | | | | | |
|-------------------------------|---|---|---|---|---|---|---|--------------------------|
| 1. Flowers 2 or more per node | : | : | : | : | : | : | : | 1. <i>A. milleflorum</i> |
| Flowers 1 per node | : | : | : | : | : | : | : | 2. <i>A. minus</i> |

1. *Arthropodium milleflorum* (DC.) Macbride

Anthericum milleflorum DC.

Leaves 3–60 cm long. Scapes 0–4-branched, up to *ca* 1.2 m tall, sterile bracts up to 1.4 cm long, fertile bracts up to 8 mm long; flowers usually 2–9 per node, pedicels erect to spreading, 0.5–1.5 cm long; perianth pale blue, sepals and petals 4–9 mm long; anthers 1–2 mm long. Capsules 4–5 mm diameter.

Known from a few localities in the Moreton and southern Wide Bay districts. Flowers spring–summer.

2. *Arthropodium minus* R. Br.

Leaves up to 35 cm long. Scapes 0–4-branched, up to *ca* 55 cm tall, sterile bracts up to 4 cm long, fertile bracts up to 1 cm long; flowers usually 1 per node, rarely 2, pedicels ± pendant, rarely erect, up to 2 cm long; perianth pale pink in south-eastern Queensland, sepals and petals up to 6 mm long; anthers up to *ca* 1 mm long. Capsules *ca* 4 mm diameter.

Known from the Stanthorpe-Wallangarra area of the Darling Downs district. Flowers spring.

Specimens of *Arthropodium minus* from Queensland are atypical and require further study.

9. *STYPANDRA* R. Br.

Tufted, rhizomatous; roots fibrous; stems elongated, leafy, simple or branched. Leaves linear, slightly folded. Inflorescences terminal loose compound cymes, partially bracteate, bracts reduced, leaf-like; perianth withering after flowering, at length falling, not twisted, segments all free, usually 5-nerved; filaments matted-hairy towards apex, glabrous below middle, anthers coiling. Fruits capsules; seeds matt black.

1 species Australia and possibly New Caledonia, occurring in south-eastern Queensland.

Placed by some authors in Phormiaceae.

1. *Stypandra glauca* R. Br.**NODDING BLUE LILY**

Plants many-stemmed, up to 1.5 m tall, up to *ca* 1 m across near base. Leaves sheathing

and equally folded at base, 1–20 cm \times 0.5–1.5 cm. Pedicels filiform, decurving, 1–2.5 cm long; perianth deep blue, pale blue or white, 0.8–1.6 cm long; anthers bright yellow. Capsules dull black, obovoid-triquetrous, 0.3–1.2 cm long. **Fig. 6A.**

Granite areas of the Darling Downs district; moderately common. Flowers spring–early summer.

10. *THELIONEMA* R. Henderson

Tufted, rhizomatous; roots fibrous; stems short. Leaves linear, crowded, basal; sheath closed near apex. Inflorescences terminal loose compound cymes, bracteate, bracts \pm subulate; perianth withering after flowering, at length falling, not twisted, segments free, 3–7-nerved; filaments papillate except at base and apex, anthers coiling. Fruits capsules; seed shiny black.

3 species endemic in eastern Australia; 2 species south-eastern Queensland.

Placed by some authors in Phormiaceae.

- | | |
|---|--------------------------|
| 1. Leaf blades 0.2–1.2 cm wide; sheaths papillose outside; seeds smooth, shiny | 1. <i>T. caespitosum</i> |
| Leaf blades 0.8–2.8 cm wide; sheaths smooth outside; seeds verruculose-rugulose, glossy | 2. <i>T. grande</i> |

1. *Thelionema caespitosum* (R. Br.) R. Henderson

Stypandra caespitosa R. Br.

Plants 30–90 cm tall, 0.5–20 cm across near base. Leaf blades flat or slightly folded, 12–55 cm \times 0.2–0.8(–1.2) cm; sheaths equally folded. Pedicels slender, divergent-spreading, 1.5–3 cm long; perianth deep blue (or also white or pale yellow outside Queensland), 0.8–1.3 cm long; anthers bright yellow. Capsules obovoid, triquetrous near apex, 4–10 mm long.

Along the coast in damp sandy or peaty situations, probably also south-eastern Darling Downs district; not common. Flowers spring–early summer.

2. *Thelionema grande* (C. T. White) R. Henderson

Stypandra grandis C. T. White

Plants 0.45–1.25 m tall, 10–25 cm across near base. Leaf blades flat or folded, 20–65 cm \times (0.8–)1.2–2.8 cm; sheaths equally folded. Pedicels slender, divergent-spreading, 1.5–3 cm long; perianth deep blue (or also white outside Queensland), 1.1–1.4 cm long; anthers bright yellow. Capsules ellipsoid-triquetrous, 8–10 mm long. **Fig. 6B.**

Southern parts of the region between Wyberba and Rathdowney, in crevices in isolated high granitic and rhyolitic rocky areas; not common. Flowers early summer.

11. *CAESIA* R. Br.

Tufted herbaceous perennials; roots tuberous or fleshy-fibrous with or without distal tubers. Leaves linear, crowded, basal. Inflorescences of racemosely arranged clusters of flowers on simple or few-branched bracteate axes, bracts leaf-like below, minute above; perianth withering and spirally twisting over ovary, at length falling, segments shortly connate at base, 3-nerved; stamens shorter than perianth, filaments papillate. Fruits capsules, depressed-globular but 3-lobed, tardily dehiscent; seeds dull black, globose, arillate.

11 species South Africa and Australia; 8 species Australia, 7 endemic; 2 species south-eastern Queensland.

Placed by some authors in Anthericaceae.

- | | |
|--|-------------------------|
| 1. Leaf blades usually more than 7 mm wide; seed testa granulate and scattered pustulate | 1. <i>C. chlorantha</i> |
| Leaf blades usually less than 5 mm wide; seed testa granulate and scattered tuberculate | 2. <i>C. parviflora</i> |

1. *Caesia chlorantha* F. Muell.

Caesia vittata R. Br. var. *chlorantha* (F. Muell.) Benth.

Plants up to 60 cm tall. Leaves 15–40 cm \times 0.5–1.5 cm. Inflorescences with branched axes, lower bracts up to 30 cm long, clusters 2–5-flowered, pedicels slender, up to 1.3 cm long; perianth segments white with green or purple nerves outside, 6–10 mm long. Capsules 4–8 mm wide; seeds 2–3 mm across.

Southern Darling Downs and Moreton districts, in black soil plains; rare. Flowers spring–summer.

2. *Caesia parviflora* R. Br.

Plants up to 55 cm tall. Leaves 10–40 cm \times 0.1–0.7 cm. Inflorescences with branched axes, lower bracts up to 20 cm long, clusters 2–6-flowered, pedicels slender, 3–10 mm long; perianth segments greenish white to blue, 3–8 mm long. Capsules 2–5 mm wide; seeds 1–2 mm wide.

Two varieties occur in the region:

1. Flowers white to pale pink or blue, often with nerves outlined in green or purple; filaments greenish white throughout

C. parviflora var.
parviflora

- Flowers blue with darker nerves; filaments blue, often with transverse white bands

C. parviflora var. *vittata*

The distribution of *C. parviflora* var. *vittata* (R. Br.) R. Henderson (*C. vittata* R. Br.) as distinct from that of *C. parviflora* var. *parviflora* is not certain because the colouration of the flowers and filaments is often lost in drying or preservation. However the species is widespread in the region. Flowers spring–summer. Suspected of poisoning pigs but evidence is not strong.

12. LILIUM L.

Perennial herbs with bulbs, above-ground parts annual; roots fibrous; stems unbranched. Leaves alternate or opposite, sessile, axillary bulbils sometimes produced. Inflorescences terminal, spikes, racemes, subumbels or flowers solitary; flowers bisexual, actinomorphic, usually large, subtended by leaf-like bracts; perianth segments 6, free; stamens 6, anthers dehiscent by slits; ovary superior, 3-locular, ovules numerous, style 1. Fruits capsules.

About 75 species from temperate northern hemisphere, many cultivated as ornamentals; 1 species naturalized Australia, occurring in south-eastern Queensland.

1. **Lilium formosanum* Wallace

Stems erect, up to 2 m tall. Leaves alternate, linear or linear-ovate, mostly up to 15 cm \times 0.5–1 cm. Inflorescences subumbellate, flowers 1–8, fragrant, pedicels 0.5–1.5 cm long; perianth segments white with mauve central line, up to 15 cm long; stamens ca 10 cm long; ovary ca 3–3.5 cm long, style 7–8 cm long. Capsules cylindrical, 5–8 cm long.

Native of Taiwan; cultivated as an ornamental and naturalized around Mt Tamborine, Maleny and Montville, and on the eastern slopes below Toowoomba, all in the Moreton district. Flowers summer–autumn.

13. THYSANOTUS R. Br.

Perennial herbs, sometimes rhizomatous; roots tuberous or fibrous. Leaves present or absent, sometimes annual. Flowers solitary or in umbels which may be arranged in panicles or cymes, on annual or perennial stems, bisexual, actinomorphic, pedicellate; perianth segments 6, free, sepals without fringed margins, petals with fringed margins; stamens 3 or 6, anthers dehiscent by terminal pores or by longitudinal slits; ovary superior, 3-locular, ovules 2 per loculus. Fruits capsules, enclosed in persistent perianth.

49 species, mainly Australia but 2 species also in south-eastern Asia and New Guinea; 1 species south-eastern Queensland.

Placed by some authors in Anthericaceae.

1. *Thysanotus tuberosus* R. Br.*Thysanotus tuberosus* subsp. *parviflorus* (Benth.) Britton

Plants glabrous; roots tuberous. Leaves annual, linear, up to 60 cm long. Inflorescences panicles of umbels, 20–60 cm long, umbels 1–8-flowered, pedicels up to 2.2 cm long, articulated towards base; perianth mauve, segments 0.7–1.9 cm long, petals fimbriate, fimbriae ca 5 mm long. Capsules ca 3–6 mm wide.

Widespread throughout the region; moderately common. Flowers spring–summer.

***Thysanotus juncifolius* (Salisb.) J. H. Willis & Court** has been recorded from south-eastern Queensland. However, the Queensland herbarium has no material of the species from Queensland. It is not included here as the next closest record is central coastal New South Wales.

14. ALLIUM L.

Perennial herbs, bulbous, usually with onion or garlic odour. Leaves basal or cauline and sheathing scape. Inflorescences scapose umbels, spathe of several bracts; flowers bisexual, actinomorphic, pedicellate; perianth segments 6, free or partially united; stamens 6, anthers dehiscent by slits; ovary superior, 3-locular, ovules 2 per loculus. Fruits capsules.

About 700 species from the northern hemisphere; ca 9 species naturalized Australia; 1 species south-eastern Queensland.

Placed by some authors in Alliaceae.

1. **Allium triquetrum* L.**THREE CORNERED GARLIC**

Bulbs subglobose, ca 1–2 cm diameter, bulblets numerous, arising at base of bulb. Leaves \pm basal, 12–45 cm \times 0.3–1.7 cm. Scapes flaccid, up to 50 cm long, umbels usually 5–10-flowered, 1-sided, pedicels 1–2.5 cm long; perianth segments white with green stripe, 1–1.8 cm long. Capsules 6–7 mm long.

Native of the western Mediterranean region; occasionally found in southern parts of the region. Flowers spring.

15. NOTHOSCORDUM Kunth

Perennial herbs, bulbous, usually without onion or garlic odour. Leaves basal, flat. Inflorescences scapose umbels, umbels arising in spathes of 2 overlapping bracts; flowers bisexual, actinomorphic, pedicellate; perianth segments 6, united at base into short tube; stamens 6, anthers dehiscent by slits; ovary superior, 3-locular, ovules 4–12 per loculus. Fruits capsules.

About 20 species North America; 1 species naturalized Australia, occurring in south-eastern Queensland.

Placed by some authors in Alliaceae.

1. **Nothoscordum gracile* (Aiton) Stearn**ONION WEED**

Allium gracile Aiton; *Nothoscordum fragrans* (Vent.) Kunth; *N. inodorum* auct. non (Aiton) Nicholson

Bulbs ovoid, 1.5–2.5 cm diameter, bulblets numerous, arising at base of bulb. Leaves 15–60 cm \times 0.4–1 cm. Scapes erect, up to 75 cm long, umbels usually 8–12-flowered, pedicels 1.5–5 cm long; perianth greenish or brownish below, white above with dull red mid-vein, 1–1.5 cm long. Capsules ca 6 mm long.

Native of North America; naturalized and widespread in the region, often a weed of gardens and cultivation. Flowers summer.

16. BURCHARDIA R. Br.

Perennial herbs with corms; roots tuberous. Leaves basal and cauline, basal leaves 1–5, linear, cauline leaves 1–4 or sometimes reduced to bracts. Inflorescences terminal umbels

with involucre bracts or solitary terminal flower; perianth segments 6, in 1 series, free, nectaries present or absent; stamens 6, anthers longitudinally dehiscent; ovary superior, 3-locular, ovules several per loculus, style 3-fid. Fruits capsules.

5 species all endemic in Australia; 1 species south-eastern Queensland.

Placed by some authors in Colchicaceae.

1. *Burchardia umbellata* R. Br.

MILKMAIDS

Burchardia umbellata var. *typica* Domin; *B. umbellata* forma *minor* Domin; *B. rigida* Gandoger

Plants up to 65 cm tall. Basal leaves 1 or 2, up to 60 cm long, stem leaves 1 or 2, upper up to 4 cm long, lower similar to basal leaves. Scape unbranched or occasionally 1-branched, umbels 2-9-flowered, bracts up to 1.2 cm long, pedicels up to *ca* 3 cm long, rarely up to 4 cm long; perianth white, occasionally pink, 5-8 mm long; anthers purple, 1.2-4 mm long. Capsules *ca* 1-1.5 cm long.

Moderately common in wallum country from Fraser I. southwards. Flowers spring-early summer.

17. LAXMANNIA R. Br.

Perennials, rhizomatous or stilt-rooted. Leaves cauline, \pm terete to triquetrous, bases sheathing. Inflorescences terminal compact umbels, pedunculate or sessile, with involucre of scarious bracts; flowers shortly pedicellate; sepals 3, free; petals 3, free or united; stamens 6, 3 inner ones adnate to petals, anthers dehiscing by slits; ovary 3-locular, ovules 1-8 per loculus, style filiform, stigma entire. Fruits capsules enclosed in persistent perianth.

13 species all endemic in Australia; 2 species south-eastern Queensland.

Placed by some authors in Anthericaceae.

- | | | | | | | | |
|---|---|---|---|---|---|---|-----------------------|
| 1. Sepals much shorter than petals | . | . | . | . | . | . | 1. <i>L. gracilis</i> |
| Sepals as long as or longer than petals | . | . | . | . | . | . | 2. <i>L. compacta</i> |

1. *Laxmannia gracilis* R. Br.

Erect herb up to 40 cm tall, but usually much less, often with stilt roots. Leaves linear, 0.6-7.5 cm \times *ca* 0.1 cm. Inflorescences pedunculate, 4-17-flowered, outer bracts reddish brown, *ca* 1-3 mm long, inner bracts white, 1-3 mm long; perianth pink, sepals 4-6 mm long, petals 5-8 mm long. **Fig. 6C.**

Widespread in the region, usually on sandy soils; moderately common. Flowers late winter-spring.

2. *Laxmannia compacta* Conran & P. Forster

Prostrate or erect plants up to *ca* 18 cm tall. Leaves linear, 0.4-5 cm \times *ca* 0.1 cm. Inflorescences pedunculate, 7-11-flowered, outer bracts pinkish brown, 2-4 mm long, inner bracts whitish, 2-4 mm long; perianth whitish or pinkish, sepals 3-4 mm long, petals 3-5 mm long.

Widespread in the region usually on sandy soils. Flowers late winter-spring.

18. SOWERBAEA Smith

Tufted perennials, roots fibrous. Leaves linear or filiform, crowded, basal. Inflorescences terminal globular umbels, on simple or branched, bare axes, pedicels bracteate, bracts scarious; perianth papery, persistent, not twisted, segments all free or inner ones shortly connate at base; stamens 3, with deeply lobed anthers, staminodes 3 or absent. Fruits capsules, enclosed within persistent perianth.

5 species, all endemic in Australia; 1 species south-eastern Queensland.

Placed by some authors in Anthericaceae.

1. *Sowerbaea juncea* AndrewsRUSH LILY; VANILLA PLANT;
CHOCOLATE LILY

Plants up to *ca* 75 cm tall. Leaves terete or semiterete, 5–50 cm \times up to 0.2 cm, sheath margins scarious, forming ligule up to 1.2 cm long. Umbels many-flowered, pedicels lengthening as flower expands; perianth segments lavender to pink or white, 5–9 mm long; anthers lobed at base, staminodes \pm equalling fertile filaments. **Fig. 6D.**

Along the coast on sandy soils in heath communities; very common. Flowers spring.

19. GLORIOSA L.

Perennial herbs, rhizomatous; stems annual, erect or climbing. Leaves alternate, sessile, produced into recurved tendril. Flowers axillary, solitary, bisexual, actinomorphic; perianth segments 6, equal, free; stamens 6, filaments filiform, anthers dehiscing by slits; ovary superior, 3-locular, ovules several per loculus, style 3-fid, stigmas 3. Fruits capsules.

5 species, Africa and Asia; 1 species naturalized Australia, occurring in south-eastern Queensland.

Placed by some authors in Colchicaceae.

1. **Gloriosa superba* L.

GLORY LILY; FLAME LILY; GLORIOSA

Climbers; stems up to 4 m long. Leaves narrowly ovate, 4–25 cm \times 1.5–4.5 cm, tendril 1–2 cm long. Pedicels 4–20 cm long; perianth yellow, orange or red, 4.5–7.5 cm diameter, sepals and petals 5–8 cm long, margins undulate; stamens 3–7 cm long; style 3.5–5.5 cm long. Capsules 3–10 cm long.

Native of Africa and Asia; cultivated as an ornamental, escaped from cultivation and naturalized in the Moreton district in sandy coastal areas. Flowers summer–autumn.

20. TRIPLADENIA D. Don

Perennial herbs, rhizomatous; stems simple; roots fibrous. Leaves alternate, distichous, sessile, multinerved. Inflorescences axillary bracteate cymes or flowers solitary; flowers bisexual, actinomorphic, pedicellate; perianth segments 6, free, equal, in 2 series; stamens 6, anthers dehiscing by slits; ovary superior, 3-locular, ovules numerous, styles 3, free or connate at base. Fruits capsules.

1 species endemic in Australia, occurring in south-eastern Queensland.

Placed by some authors in Uvulariaceae.

1. *Tripladenia cunninghamii* D. Don

Kreysegia cunninghamii (D. Don) F. Muell.; *K. tripladenia* F. Muell.; *K. multiflora* auct. non (R. Br.) Reichb.

Plants up to 40 cm tall. Leaves ovate or narrowly ovate, apex acute, base tapering, 4–7 cm \times 1–2.5 cm. Peduncles 3–6 cm long, pedicels 1–3 cm long; perianth segments pink, 0.7–1.2 cm \times 0.4–0.7 cm; stamens 5–6 mm long; styles 1–2 mm long. Capsules 6–8 mm diameter.

Known from a few places in the Moreton district, usually in shady areas in open forests and wet eucalypt forests. Flowers spring–summer.

21. DICHPOGON Kunth

Perennial herbs; roots with tubers. Leaves erect. Inflorescences racemes or panicles; flowers *ca* 1–6 per node, bisexual, actinomorphic; perianth segments 6, free, in 2 series; stamens 6, anthers longer than filaments, dehiscing by longitudinal slits, each with 2 or 4 densely hairy basal appendages, filaments glabrous; ovary superior, 3-locular, ovules up to 6 per locule. Fruits capsules.

5 species, Australia with 1 extending to New Guinea; 2 species south-eastern Queensland.

Placed by some authors in Anthericaceae.

- | | |
|---|-------------------------|
| 1. Flowers 1 per node; pedicels erect in flower and fruit | 1. <i>D. strictus</i> |
| Flowers 2-6 at some or most nodes, solitary at others; pedicels spreading in flower, nodding in fruit | 2. <i>D. fimbriatus</i> |

1. *Dichopogon strictus* (R. Br.) Baker

Arthropodium strictum R. Br.

Leaves 9-65 cm \times 0.1-1 cm. Inflorescences racemes 25-100 cm long; flowers 1 per node, pedicels erect in flower and fruit, up to 3.7 cm long, bracts 0.5-1.5 cm long; perianth purple, sepals and petals 0.6-1.4 cm long; anthers usually purple, 3-4.5 mm long, appendages usually yellow, filaments up to 3 mm long; style 3.5-6 mm long. Capsules \pm spherical, 4-7 mm diameter.

Known from a few places in the Darling Downs and Moreton districts. Flowers spring-summer.

2. *Dichopogon fimbriatus* (R. Br.) Macbride

CHOCOLATE LILY

Arthropodium fimbriatum R. Br.

Leaves 5-35 cm \times 0.1-0.5 cm. Inflorescences racemes or paniculately 3-branched, 15-100 cm long; flowers 2-6 at some or most nodes, solitary at others, pedicels spreading in flower, nodding in fruit, up to 1.5 cm long, bracts 2.5-10 mm long; perianth purple, sepals and petals 0.5-1.2 cm long; anthers purple, 3.5-6 mm long, appendages usually purple, filaments up to 4 mm long; style 4-7 mm long. Capsules \pm cylindrical, 6 mm long.

Known from the Stanthorpe-Wallangarra area of the Darling Downs district. Flowers spring-summer.

22. ASPHODELUS L.

Annuals or perennials, shortly rhizomatous or with fibrous roots or tubers. Leaves basal, linear. Inflorescences scapose racemes or panicles, scapes bracteate; flowers bisexual, actinomorphic, pedicellate; perianth segments 6, free or connate at base; stamens 6, anthers dehiscent by slits; ovary superior, 3-locular, ovules 2 per loculus, style simple, stigma 3-lobed. Fruits loculicidal capsules.

About 12 species from the Mediterranean region to India; 1 species naturalized Australia, occurring in south-eastern Queensland.

Placed by some authors in Asphodelaceae.

1. **Asphodelus fistulosus* L.

ONION WEED

Annual or biennial; roots fibrous. Leaves tubular, up to 40 cm \times 0.15-0.4 cm. Inflorescences scapose panicles up to 70 cm tall, flowers subtended by bracts; perianth pink or white with a conspicuous red-brown nerve, segments shortly connate at base, 0.8-1.2 cm long; stamens somewhat shorter than perianth; style \pm as long as stamens. Capsules subglobose, 4-7 mm long.

Native of southern Europe to India; naturalized in the Moreton and eastern Darling Downs districts.

23. BLANDFORDIA Smith

Tufted, with tuber-like basal corm; roots fleshy-fibrous. Leaves linear, crowded. Inflorescences short simple terminal racemes on long erect stalks, flowers in axils of narrow bracts, each with smaller bracteole near base of pedicel; perianth persistent, tubular or bell-shaped, 6-lobed; stamens adnate to perianth. Fruits capsules, stipitate; seeds numerous, hairy.

4 species, all endemic in eastern Australia; 1 species south-eastern Queensland.

Placed by some authors in Blandfordiaceae.

1. *Blandfordia grandiflora* R. Br.

CHRISTMAS BELLS

Blandfordia flammea Lindl. ex Paxton; *B. flammea* var. *aurea* F. M. Bailey

Leaves 30-70 cm long; blades wide with crenulate-scabrid margins 2-5 mm wide, nerves



Fig. 6 LILIACEAE — **A** *Stypandra glauca*, flower x 2; **B** *Thelionema grande*, flower x 2; **C** *Laxmannia gracilis*, flower x 4; **D** *Sowerbaea juncea*, flower x 1; **E** *Iphigenia indica*, fruiting plant x $\frac{1}{2}$; **F** *Wurmbea biglandulosa*, upper part of plant with flowers x 1.

prominent. Perianth red with yellow lobes or yellow throughout, 3.5–6 cm long, lobes semicircular, mucronate, 0.8–1.2 cm long. Capsules up to *ca* 6 cm long, on stalk up to *ca* 6 cm long.

Coastal wallum areas from Fraser I. to the New South Wales border; not common. Flowers early summer. Cultivated as an ornamental in Europe and North America as well as temperate Australia.

24. IPHIGENIA Kunth

Perennial herbs with corms. Leaves basal and cauline, several, sheathing at base. Inflorescences cymes, racemes or solitary terminal flowers; flowers bisexual, actinomorphic, pedicellate; perianth segments 6, free, in 1 series, without nectaries; stamens 6, anthers longitudinally dehiscent; ovary superior, 3-locular, ovules several per loculus, styles 3, free or partially connate. Fruits capsules.

About 13 species, Africa, Madagascar, India, south-eastern Asia and Australia; 1 species Australia, occurring in south-eastern Queensland.

Placed by some authors in Colchicaceae.

1. *Iphigenia indica* (L.) Kunth

Melathrium indicum L.

Plants up to 50 cm tall. Leaves 3–6, cauline, usually well spaced, linear or gradually tapering, 3–20 cm \times 0.15–0.45 cm. Inflorescences 1–4-flowered, pedicels usually 0.3–6 cm long; perianth reddish, segments 0.6–1.1 cm long; stamens 0.2–5.5 mm long, anthers purple, 1–1.5 mm long. Capsules 0.6–2.5 cm long. **Fig. 6E.**

Known from a few localities around Brisbane. Flowers summer–autumn.

25. WURMBEA Thunb.

Perennial herbs with corms. Leaves basal or cauline, few, sheathing at base. Inflorescences spikes or flowers solitary; male and female flowers on separate plants or bisexual and male flowers on same plant, or all flowers bisexual; perianth segments 6, rarely 7 or 8, \pm connate below middle, \pm equal, in 1 series, each segment with 1 or 2 usually conspicuous nectaries; stamens 6, rarely 7 or 8, anthers dehiscing by slits; ovary superior, 3-locular or 4-locular when perianth segments 7 or 8, ovules many per loculus, styles 3, 4 when segments 7 or 8, free or connate below middle. Fruits capsules.

40 species Australia and Africa; 19 species Australia; 2 species south-eastern Queensland.

Placed by some authors in Colchicaceae.

- | | | | | |
|---|---|---|---|---------------------------|
| 1. Nectaries 1 per perianth segment, purple or greenish | . | . | . | 1. <i>W. dioica</i> |
| Nectaries 2 per perianth segment, pink | . | . | . | 2. <i>W. biglandulosa</i> |

1. *Wurmbea dioica* (R. Br.) F. Muell.

Anguillaria dioica R. Br.

Plants 3.5–30 cm tall. Leaves 3, filiform or linear, upper leaf dilated at base, central leaf less dilated at base than upper and longer than upper, lower leaf not dilated at base and usually longer than central one. Inflorescences spikes of 1–11 flowers; perianth white with purple nectaries or yellowish or greenish with purple or greenish nectaries, 0.35–1.15 cm long, segments 6, connate for less than $\frac{1}{6}$ length, nectary 1 per perianth segment at or below middle of segment; stamens *ca* 2–8 mm long, anthers purple or red, 1–1.5 mm long. Capsules *ca* 6 mm long.

Known from a few localities in the Moreton and Wide Bay districts. Flowers spring.

2. *Wurmbea biglandulosa* (R. Br.) T. Macfarlane

Anguillaria biglandulosa R. Br.

Plants 3.5–30 cm tall. Leaves 3, filiform to linear, upper leaf dilated at base, central leaf dilated at base and longer than upper one, lower leaf usually not dilated at base and

longer than central one. Inflorescences spikes of 1–6 flowers; perianth white with pink nectaries, 0.8–1 cm long, segments connate for less than $\frac{1}{10}$ length, nectaries 2, *ca* $\frac{1}{3}$ distance from base; stamens *ca* 2.5–5 mm long, anthers purple or red, 1.5–2 mm long. Capsules *ca* 6 mm long. **Fig. 6F.**

Known from extreme south-eastern Moreton district and south-eastern Darling Downs district. Flowers spring.

166. XANTHORRHOEACEAE

Perennials, stems often condensed and at least partially underground. Leaves often tufted, linear, often with broad persistent base. Inflorescences terminal or axillary heads, spikes, panicles, racemes, cymes or umbels, or flowers solitary, usually scapose, bracteate; flowers bisexual or unisexual and then plants dioecious; sepals 3, free or united in lower half, sometimes petaloid; petals 3, free or united in lower half; stamens 6, anthers 2-locular; ovary superior, 1- or 3-locular, ovules 1–many per loculus. Fruits loculicidal capsules or rarely 1-seeded nuts; seeds with copious endosperm.

10 genera with *ca* 100 species, mostly endemic in Australia with few species also in New Guinea and New Caledonia; 10 genera with *ca* 99 species Australia, 96 endemic; 3 genera with 17 species south-eastern Queensland.

1. Flowers unisexual; plants dioecious	.	.	.	.	.	.	1. <i>Lomandra</i>	
Flowers bisexual	.	.	.	.	.	.	.	2
2. Inflorescences panicles	.	.	.	.	.	.	2. <i>Romnalda</i>	
Inflorescences spikes	.	.	.	.	.	.	3. <i>Xanthorrhoea</i>	

1. LOMANDRA Labill.

Herbaceous dioecious perennials. Leaves distichous, basal margins sheathing. Male and female inflorescences often dissimilar, spikes, racemes or panicles, flowers solitary along axis or in clusters; sepals and petals free or connate; outer stamens inserted on receptacle or on rim of perianth tube, inner stamens inserted on perianth; ovary 3-locular, ovules 1 per loculus. Fruits loculicidal capsules.

50 species New Guinea, Australia and New Caledonia; 50 species Australia, 48 endemic; 11 species south-eastern Queensland.

All species of **Lomandra** are known as MATRUSHES.

1. Flowers 1–3 together, arranged in racemes or panicles	.	.	.	.	.	.	2
Flowers in globular or cylindrical heads or in distinct clusters, the clusters arranged in spikes or panicles	.	.	.	.	.	.	4
2. Leaves thick, \pm semicircular in cross section	.	.	.	.	.	.	1. <i>L. gracilis</i>
Leaves thin, not semicircular in cross section, though sometimes margins inrolled	.	.	.	.	.	.	3
3. Leaf apices rounded or truncate; female flowers 3–4.5 mm long	.	.	.	.	.	.	2. <i>L. laxa</i>
Leaf apices with 2 lateral teeth or acuminate if very narrow; female flowers 2–3 mm long	.	.	.	.	.	.	3. <i>L. filiformis</i>
4. Cluster bracts modified and appearing as a mass of hairs, giving the flower heads a woolly appearance	.	.	.	.	.	.	4. <i>L. leucocephala</i>
Cluster bracts not modified, though sometimes inconspicuous, inflorescences not appearing woolly	.	.	.	.	.	.	5
5. Leaves less than 10 cm long	.	.	.	.	.	.	6
Leaves more than 10 cm long	.	.	.	.	.	.	7

- | | | |
|---|----------------------------|----|
| 6. Perianth of male flowers <i>ca</i> 2 mm long, connate in lower half; perianth of female flowers <i>ca</i> 3 mm long | 5. <i>L. obliqua</i> | |
| Perianth of male flowers 3–3.5 mm long, not connate; perianth of female flowers 4–4.5 mm long | 6. <i>L. confertifolia</i> | |
| 7. Leaf apices rounded or pointed, without lateral teeth; cluster bracts inconspicuous | | 8 |
| Leaf apices with lateral teeth; cluster bracts usually conspicuous | | 9 |
| 8. Leaves 1.5–4 mm broad, apex rounded, basal sheaths not or scarcely lacerated; male flowers on pedicels up to 1.2 cm long, female flowers sessile | 7. <i>L. multiflora</i> | |
| Leaves 1–1.5 mm broad, apex pointed, basal sheaths becoming lacerated; male and female flowers sessile | 8. <i>L. elongata</i> | |
| 9. Leaves 0.5–2.5 mm broad | 6. <i>L. confertifolia</i> | |
| Leaves 4 mm or more broad | | 10 |
| 10. Inflorescences spikes, rarely with a few basal branches or rachis forked; plants of rainforest at high altitudes | 9. <i>L. spicata</i> | |
| Inflorescences panicles with many branches; plants from a variety of habitats | | 11 |
| 11. Major primary branches of inflorescences usually 4 per node; secondary branching extensive | 10. <i>L. hystrix</i> | |
| Major primary branches of inflorescences usually 2 per node; secondary branching absent or sparse | 11. <i>L. longifolia</i> | |

1. *Lomandra gracilis* (R. Br.) A. T. Lee

Xerotes gracilis R. Br.

Plants forming sparse tussocks. Leaves thick, \pm semicircular in cross section, apex acute, mostly *ca* 40 cm \times 0.1–0.2 cm, basal sheaths lacerated. Inflorescences panicles; male inflorescences up to as long as leaves, pedicels 3–5 mm long, perianth yellow, 2.5–3 mm long; female inflorescences slightly shorter than males, pedicels 1–2 mm long, perianth not seen. Capsules not seen.

Recorded twice for the region, once from south-eastern Darling Downs district and once from eastern Moreton district.

2. *Lomandra laxa* (R. Br.) A. T. Lee

Xerotes laxa R. Br.

Plants forming sparse tussocks or with leafy decumbent stems. Leaves \pm flat, apex rounded or truncate, margin sometimes somewhat inrolled, 15–40 cm \times 0.2–0.4 cm. Inflorescences panicles with opposite or whorled branches; male inflorescences up to as long as leaves, pedicels up to *ca* 2.5 mm long, perianth creamy white, *ca* 2–2.5 mm long; female inflorescences slightly shorter than males, pedicels *ca* 0.5 mm long, perianth creamy white, 3–4.5 mm long. Capsules *ca* 4 mm long.

Widespread but not common in eastern Moreton district, usually in sandy or gravelly soils, also known from the Bunya Mts and Mt Perry in the Burnett district. Flowers autumn–winter.

3. *Lomandra filiformis* (Thunb.) Britten

Dracaena filiformis Thunb.; *Xerotes filiformis* (Thunb.) R. Br.

Plants forming sparse clumps or mats up to 20 cm diameter. Leaves linear, concavo-convex in cross section, apex with 2 lateral teeth, eroding with age, acuminate if very narrow, margin inrolled, mostly 10–45 cm \times 0.05–0.3(–0.5) cm, basal sheaths usually eventually lacerate. Male inflorescences racemes or panicles with few short branches, 2–20(–30) cm long, from *ca* $\frac{1}{2}$ to as long as leaves, female inflorescences similar but shorter than males; male flowers yellow, 1.5–2.5 mm long, pedicels up to *ca* 4 mm long, often longer than flower; female flowers yellow, 2–3 mm long, pedicels up to 1 mm long. Capsules 4–5 mm long.

Widespread in the region, often in sandy or rocky soils. Flowers spring.

4. *Lomandra leucocephala* (R. Br.) Ewart*Xerotes leucocephala* R. Br.

IRON GRASS

WOOLLY MATRUSH

Plants forming clumps. Leaves linear, flat, apex obtuse to acute, 20–60 cm \times 0.1–0.2 cm (in south-eastern Queensland), basal sheaths lacerated and giving cottony appearance to base of plants. Inflorescences shorter than leaves, capitate, globular to cylindrical, cluster bracts modified and appearing as a mass of hairs; male inflorescences sometimes with 1–3 globular or cylindrical segments 1–3 cm \times 1–2 cm (in south-eastern Queensland), female inflorescences usually not segmented (in south-eastern Queensland), 1.5–3 cm \times 1–2 cm. Capsules *ca* 7 mm long.

Known from the Burnett and Darling Downs districts, usually in sandy soils or in rocky areas. Flowers late winter–spring.

5. *Lomandra obliqua* (Thunb.) J. F. Macbride*Dracaena obliqua* Thunb.; *Xerotes obliqua* (Thunb.) Domin

Plants decumbent; stems branched. Leaves linear, \pm flat, spreading or recurved, often twisted, apex pointed, mostly 2–5 cm \times 0.1–0.2 cm, occasionally longer, basal sheaths not becoming lacerated. Male inflorescences spikes or panicles of flower clusters with scape inconspicuous, rachis *ca* 2–10 cm long, bracts obscured by flowers, flowers in sessile clusters, perianth *ca* 2 mm long, sepals and petals connate in lower $\frac{1}{2}$; female inflorescences sessile or scapose heads, *ca* 5–8 mm diameter, scape 0–3 cm long, bracts obscured by flowers, flowers yellow flushed with purple, perianth *ca* 3 mm long. Capsules *ca* 5 mm long.

Recorded in the region from northern outskirts of Brisbane and from Mt. Coolum in northern Moreton district. The Brisbane locality has been considerably reduced in size by housing development. Flowers spring.

6. *Lomandra confertifolia* (F. M. Bailey) Fahn*Xerotes confertifolia* F. M. Bailey

Plants with decumbent or erect stems. Leaves linear, \pm flat or concavo-convex in cross section, apex 2–3-toothed, 1 or both lateral teeth exceeding central tooth, 3.5–70 cm \times 0.05–0.25 cm, basal sheaths entire or lacerated. Male inflorescences spikes or few-branched panicles of flower clusters, whole inflorescence $\frac{1}{4}$ – $\frac{2}{3}$ as long as leaves, cluster bracts often longer than flowers, up to *ca* 1.5 mm long; female inflorescences smaller than males, often a single flower cluster amongst leaf bases; flowers sessile, males 3–3.5 mm long, females 4–4.5 mm long; sepals purplish or yellowish; petals yellowish. Capsules *ca* 5 mm long.

Two subspecies occur in the region:

1. Leaves 3.5–25 cm \times 0.05–0.15 cm, old leaves curled back on stem;
plants of rock crevices on mountains *L. confertifolia* subsp.
confertifolia

- Leaves mostly 30–70 cm \times 0.1–0.25 cm rarely shorter, old leaves
rarely curled back on stem; plants found in a variety of habitats . . . *L. confertifolia* subsp.
pallida

Lomandra confertifolia subsp. *confertifolia* is found in a few places in the Moreton and Wide Bay districts, in rock crevices on mountain tops. Flowers spring to autumn. *L. confertifolia* subsp. *pallida* A. T. Lee is found in the Moreton and Wide Bay districts in a variety of habitats and has also been collected in the Burnett district. Flowers winter–spring.

7. *Lomandra multiflora* (R. Br.) Britten

MANY FLOWERED MATRUSH

Xerotes multiflora R. Br.; *X. multiflora* var. *aemula* (R. Br.) Domin; *X. multiflora* var. *decomposita* (R. Br.) Domin; *X. multiflora* var. *distans* (R. Br.) Domin; *X. multiflora* var. *media* (R. Br.) Domin; *X. savannorum* Domin

Plants forming clumps. Leaves linear, usually flat or slightly concavo-convex or \pm semicircular in cross section, rarely terete, apex not toothed, usually rounded, 25–90 cm \times 0.15–0.4 cm, basal sheaths not or scarcely lacerated. Male inflorescences racemes or panicles of flower clusters, up to $\frac{3}{4}$ length of leaves, usually branched, rarely unbranched, branches whorled, flower clusters whorled, bracts obscured by flowers, pedicels up to 1.2 cm long, perianth creamy yellow, mostly 2–3 mm long; female

inflorescences spikes of flower clusters, flowers creamy yellow, sessile, perianth 2.5–4 mm long. Capsules *ca* 5 mm long.

Widespread in the region, usually in open woodland or open forest; common. Flowers late winter to summer.

8. *Lomandra elongata* (Benth.) Ewart

Xerotes elongata Benth.

Plants forming clumps; stems short. Leaves linear, \pm semicircular in cross section, apex acute, mostly 30–40 cm \times 0.1–0.15 cm, occasionally longer, basal sheaths becoming lacerated. Male inflorescences spikes of flower clusters, scape up to 3 cm long, rachis unbranched, up to 5 cm long, flower clusters sessile, bracts obscured by flowers, perianth *ca* 2 mm long, sepals and petals connate in lower $\frac{1}{2}$; female inflorescences shortly scapose heads 1–1.5 cm diameter, rarely in 2 segments, bracts obscured by flowers, flowers yellowish flushed with purple, perianth *ca* 3 mm long. Capsules *ca* 4 mm long.

Known from the Moreton and Wide Bay districts, in sandy coastal areas. Flowers spring.

9. *Lomandra spicata* A. T. Lee

Xerotes montana auct. non R. Br.; *X. longifolia* Labill. var. *montana* auct. non (R. Br.) F. M. Bailey; *Lomandra montana* auct. non (R. Br.) L. Fraser & Vickery

Plants forming clumps. Leaves linear, flat, apex with few lateral teeth, usually exceeded by central point, 30–80 cm \times 0.4–1.2 cm, basal sheaths entire or coarsely lacerated. Inflorescences spikes of flower clusters, male inflorescences mostly unbranched or rarely with few short branches or rachis forked, scapes flattened, 2 or more times longer than rachis, whole inflorescence up to *ca* 30 cm long, shorter than leaves, flower clusters whorled; cluster bracts conspicuous, usually longer than flowers; female inflorescences unbranched, cluster bracts conspicuous, usually longer than flowers; flowers sessile, males 3–3.5 mm long, females 4–4.5 mm long; sepals purplish or yellowish; petals yellowish. Capsules fleshy when young, *ca* 6 mm long.

Moreton district, from rainforest often at high altitudes. Flowers spring.

10. *Lomandra hystrix* (R. Br.) L. Fraser & Vickery

Xerotes hystrix R. Br.; *X. longifolia* (Labill.) R. Br. var. *hystrix* (R. Br.) Domin; *Lomandra longifolia* Labill. subsp. *hystrix* (R. Br.) A. T. Lee

Robust plants forming clumps. Leaves linear, flat, apex acute with 2–4 often minute teeth usually well below apex, rarely lateral teeth longer than apex, 90–130 cm \times 0.5–1.1 cm, basal sheaths entire. Male and female inflorescences similar, panicles of flower clusters with primary and secondary branching, whole inflorescence up to as long as leaves, rachis flattened, major primary branches usually 4 per node, up to *ca* 20 cm long, flower clusters whorled, cluster bracts conspicuous, 0.8–6.5 (–9) cm long; flowers sessile, males 3–3.5 mm long, females 4–4.5 mm long; sepals purplish or yellow; petals yellowish or cream. Capsules *ca* 5 mm long.

Known from a few localities in the Moreton district, usually alongside rivers or creeks. Flowers spring–summer.

11. *Lomandra longifolia* Labill.

SPINYHEAD MATRUSH;
LONG LEAVED MATRUSH

Xerotes longifolia (Labill.) R. Br.; *X. longifolia* var. *typica* Domin; *X. longifolia* var. *arenaria* (R. Br.) Domin; *X. longifolia* var. *macrocarpa* Domin; *Lomandra longifolia* subsp. *exilis* A. T. Lee

Plants forming clumps. Leaves linear, usually flat, occasionally rolled, apex 2–3-toothed, mostly 50–100 cm \times 0.4–0.8 cm, basal sheaths not or coarsely lacerated. Male and female inflorescences similar, panicles of flower clusters, simple or branched, branches often 2 per node, scape distinct, whole inflorescence shorter than leaves, rachis flattened, branches mostly 5–15 cm long, flower clusters whorled, cluster bracts conspicuous, 0.8–6 cm long; flowers sessile, males 3–3.5 mm long, females 4–4.5 mm long; sepals purplish or yellow; petals yellowish or cream. Capsules *ca* 5 mm long.

Widespread in eastern parts of the region, in a variety of habitats; common. Flowers spring–summer. It has been suspected of poisoning stock. Often cultivated as an ornamental.

2. ROMNALDA P. Stevens

Herbaceous perennials, glabrous; stems short, decumbent. Leaves alternate, crowded. Inflorescences panicles; flowers clustered in cymes, bisexual; sepals and petals persistent; stamens fused at base, inserted on perianth; ovary 3-locular, ovules 2 per loculus, style slender. Fruits loculicidal capsules.

3 species, New Guinea and Australia; 2 species Australia; 1 species south-eastern Queensland.

1. *Romnalda strobilacea* R. Henderson & Sharpe

Plants up to *ca* 1 m tall; stems up to *ca* 10 cm long. Leaves linear, apex attenuate becoming \pm rounded, 50–80 cm \times 0.8–1 cm. Inflorescences up to 90 cm long, sparsely and irregularly branched in upper third; flowers white; sepals *ca* 3 mm long; petals *ca* 2.5 mm long. Capsules depressed globular, *ca* 6 mm long.

Restricted to north-eastern Moreton district and south-eastern Wide Bay district, on soils derived from basalt, in rainforest.

3. XANTHORRHOEA Smith

Plants with woody subterranean or arborescent stems covered with old leaf bases. Leaves usually tufted, linear. Inflorescences cylindrical spikes on stout woody scapes; flowers bisexual, arranged in clusters surrounded by bracts; sepals free; petals free; stamens exserted; ovary 3-locular, ovules several per loculus. Fruits loculicidal capsules.

28 species endemic in Australia; 5 species south-eastern Queensland.

All species are known as GRASSTREES or BLACKBOYS.

- | | |
|--|------------------------|
| 1. Scapes shorter than or as long as spikes | 2 |
| Scapes longer than spikes | 3 |
| 2. Leaves glaucous; scapes 2.5–4.5 cm diameter; spikes 4–6 cm diameter | 1. <i>X. glauca</i> |
| Leaves green, not glaucous; scapes 0.7–2 cm diameter; spikes 2–4 cm diameter | 2. <i>X. johnsonii</i> |
| 3. Flowers large, petals exceeding bracts by 4–5 mm, filaments exceeding petals by <i>ca</i> 10 mm | 3. <i>X. macronema</i> |
| Flowers small, no floral part exceeding bracts by more than 5 mm | 4 |
| 4. Leaves \pm rhombic in cross section, 1–2.5 mm wide, not glaucous | 2. <i>X. johnsonii</i> |
| Leaves triangular in cross section or almost flat, 2–6 mm wide, glaucous or not glaucous | 5 |
| 5. Leaves glaucous, 2–3.5 mm wide; spikes 0.1–0.6 m long | 4. <i>X. fulva</i> |
| Leaves not glaucous, 2.5–6 mm wide; spikes 0.5–1.2 m long | 5. <i>X. latifolia</i> |

1. *Xanthorrhoea glauca* Bedford

Xanthorrhoea australis auct. non R. Br.

Stems up to 5 m tall, sometimes branched. Leaves glaucous, \pm rhombic in cross section, 2.5–5 mm wide (in Queensland). Scapes 50–100 cm long, 2.5–44.5 cm diameter, shorter than spikes; spikes 1–2 m long, 4–6 cm diameter, cluster bracts conspicuous, upturned as much as 2 cm over bract surface, almost glabrous.

Known from the McPherson Ra., the Great Dividing Ra. and also recorded from the Binjour Plateau in the Burnett district, on steep slopes on rich basaltic soils; locally common. Flowers winter–spring.

2. *Xanthorrhoea johnsonii* A. T. Lee

FOREST GRASSTREE

Xanthorrhoea quadrangulata auct. non F. Muell., F. M. Bailey

Aerial stems mostly up to 2 m tall but occasionally up to 5 m tall, usually unbranched. Leaves green, \pm rhombic in cross section, 1–2.5 mm wide. Scapes 0.6–2 m long, 0.7–2 cm diameter, longer or shorter than spike; spikes 0.2–1.8 m long, occasionally over 2 m long, 2–4 cm diameter, cluster bracts prominent in lower portion of spike, hirsute to \pm glabrous.

Widespread in the region, on a variety of soil types, usually in open eucalypt communities; moderately common. Flowers autumn to summer.

3. *Xanthorrhoea macronema* F. Muell. ex Benth.

Aerial stems absent, subterranean stems sometimes branched. Leaves green, shining, \pm triangular in cross section, 2.5–3.5 mm wide. Scapes 1–1.6 m long, 4–5 mm diameter, longer than spikes; spikes 5–16 cm long, 1.4–2 cm diameter, cluster bracts obscure; petals prominent, exceeding bracts by 4–5 mm; filaments exceeding petals by *ca* 1 cm. Capsules with fine points 4–10 mm long.

Coastal areas of the region from the New South Wales border to as far north as Fraser I.; not common. Flowers spring–summer.

4. *Xanthorrhoea fulva* (A. T. Lee) Bedford

SWAMP GRASSTREE

Xanthorrhoea resinosa Pers. subsp. *fulva* A. T. Lee; *X. hastilis* auct. non R. Br., F. M. Bailey

Aerial stems absent, subterranean stems branched. Leaves glaucous, \pm triangular in cross section or almost flat, 2–3.5 mm wide. Scapes 0.2–1.6 m long, 0.5–2 cm diameter, longer than spikes; spikes 10–60 cm long, 1–3 cm diameter, cluster bracts obscure or only slightly prominent, densely hairy.

Coastal parts of the region in swamps and wallum areas; moderately common. Flowers late winter–spring.

5. *Xanthorrhoea latifolia* (A. T. Lee) Bedford subsp. *latifolia*

Xanthorrhoea media R. Br. subsp. *latifolia* A. T. Lee; *X. arborea* ? auct. non R. Br., F. M. Bailey; *X. minor* ? auct. non R. Br., F. M. Bailey

Aerial stems absent or up to 2 m tall, occasionally taller, branched or unbranched. Leaves green, rhombic to triangular in cross section or nearly flat, 2.5–6 mm wide. Scapes 1–2 m long, 1–1.6 cm diameter, 1–2 times as long as spike; spike 0.5–1.2 m long, 2–3.5 cm diameter, cluster bracts obscure, obtuse to shortly acute.

Eastern parts of the region, on sandy or stony soils in open eucalypt communities; moderately common. Flowers autumn to spring.

X. *latifolia* subsp. *maxima* Bedford has been recorded from Mt Warning and Whian Whian State Forest just south of the Queensland/New South Wales border, and could also be expected to occur on areas of rhyolite-derived soils of the McPherson Ra. It can be distinguished from **X. *latifolia* subsp. *latifolia*** by the scape being more than twice as long as the spike, acute cluster bracts, and distinctly swollen leaf bases which are sometimes dark red.

167. HAEMODORACEAE

Perennial herbs with rhizomes, bulbs or tubers. Leaves usually basal, base sheathing. Inflorescences variable, panicles, cymes, racemes or cymose umbels, occasionally flowers solitary; flowers bisexual, actinomorphic or zygomorphic; perianth segments 6, free or partly united, in 1 or 2 whorls; stamens 3–6, filaments free or adnate to perianth tube, anthers dehiscent by longitudinal slits; ovary inferior, half-inferior or in non Australian species superior, 3-locular. Fruits usually capsules.

14 genera with *ca* 100 species, South Africa, Malaysia, the Americas and Australia; 7 genera with 84 species Australia; 1 genus with 3 species south-eastern Queensland.

1. HAEMODORUM Smith

Glabrous herbs with bulbs. Leaves basal and cauline, grading upwards into bracts, sheathing bases with open margins. Inflorescences bracteate panicles or corymbose panicles or simple or branched racemes. Flowers actinomorphic; sepals and petals 3, free; stamens 3, inserted on petals; ovary inferior. Capsules 3-lobed.

20 species, Australia, 1 extending to New Guinea; 3 species south-eastern Queensland.

1. Leaf blades \pm terete, less than 2 mm diameter; flowers 0.45–0.5 cm long, brown or grey and glaucous outside, red inside; anthers 1.3–1.5 mm long

1. *H. tenuifolium*

Leaf blades flat, 1.5–7 mm wide; flowers 0.9–1.7 cm long, blackish inside and outside; anthers 2.5–5 mm long

2

2. Styles at anthesis usually longer than anthers; anthers 3–5 mm long; flowers in groups

2. *H. planifolium*

Styles at anthesis shorter than anthers; anthers 2.5–3 mm long; flowers solitary

3. *H. austroqueenslandicum*

1. *Haemodorum tenuifolium* Cunn. ex Benth.

Plants 30–80 cm tall. Basal leaves 3 or 4; blades \pm terete, less than 2 mm diameter. Inflorescences paniculate; flowers solitary or in groups of 2–5, brown or grey and glaucous outside, 4.5–5 mm long; anthers 1.3–1.5 mm long; style at anthesis reaching base or middle of anthers.

Coastal parts of the region from about Fraser I. southwards, usually in swampy areas. Flowers spring–summer.

2. *Haemodorum planifolium* R. Br.

Plants 0.6–1.4 m tall. Basal leaves 5–8; blades flat, 2–5.5 mm wide. Inflorescences paniculate; flowers many together in corymbose or non corymbose groups, blackish, 1.1–1.7 cm long; anthers 3–5 mm long; style at anthesis usually exceeding anthers.

Known in the region from the vicinity of Stanthorpe in south-eastern Darling Downs district, usually on sandy soils in sandstone or granite areas. Flowers spring–summer.

3. *Haemodorum austroqueenslandicum* Domin

Plants 0.6–1.5 m tall. Basal leaves 3–9; blades flat, 1.5–7 mm wide. Inflorescences narrow panicles; flowers solitary, blackish, 0.9–1.2 cm long; anthers 2.5–3 mm long; style at anthesis reaching to ca middle of anthers.

Widespread in the region, often on sandy soils. Flowers spring–summer.

168. AMARYLLIDACEAE

Herbs with bulbs or rarely rhizomes. Leaves few, basal, \pm linear, nerves parallel. Inflorescences umbellate; flowers solitary to many, subtended by an involucre of membranous bracts; perianth with or without tube, segments or lobes 6 in 2 series; stamens 6, hypogynous or inserted on tube below segments, filaments free or connate and forming corona, anthers 2-locular, opening by longitudinal slits; ovary superior or inferior, styles slender with capitate or 3-lobed stigma. Fruits capsules or fleshy and indehiscent; seeds numerous.

About 85 genera with 1100 species, mostly tropical and subtropical parts of the world but some from temperate areas; ca 8 genera with 17 species Australia, 6 species naturalized; 4 genera with 7 species south-eastern Queensland.

1. Flowers with coronas; perianth tubes 0.6–1.2 cm long 2
 Flowers without coronas; perianth tubes 1.5–11 cm long or perianth segments free 3

2. Leaves less than 2 cm broad 1. *Calostemma*
 Leaves 10 cm or more broad (in south-eastern Queensland) 2. *Proiphys*

3. Flowers solitary on scape 3. *Zephyranthes*
 Flowers 4–40 per scape (in south-eastern Queensland) 4. *Crinum*

1. *CALOSTEMMA* R. Br.

Perennial herbs with bulbs. Leaves annual, expanding after flowering. Inflorescences pedunculate umbels, bracts 2 or 3; flowers actinomorphic, fragrant; perianth tubular, lobes 6; stamens 6, inserted at throat of perianth tube, lower parts of filaments united and

expanded to form corona; ovary inferior, 1-locular. Fruits subglobose, embryos apparently absent but seed-like bulbils apparently form in ovary, as bulbils mature the fruit is ruptured irregularly.

2 species endemic in Australia; 1 species south-eastern Queensland.

1. *Calostemma luteum* Sims

Bulbs *ca* 3–6 cm diameter. Leaves up to *ca* 50 cm \times 0.5–1.1 cm. Umbels with 20–30 flowers, peduncles mostly 30–50 cm long, bracts yellow, 3–6.5 cm long, pedicels mostly 3–5 cm long, perianth mostly yellow, often with pink tonings at base, tube 0.6–1.2 cm long, lobes 1.4–2 cm long; corona yellow or pink, 0.9–1.2 cm long. Fruits 0.7–1.2 cm diameter.

Known from the western Darling Downs district, usually in heavy often seasonally inundated soils. Flowers spring.

2. PROIPHYS Herbert

Perennial herbs with bulbs. Leaves annual, expanding after flowering. Inflorescences pedunculate umbels, bracts 2–4; flowers actinomorphic; perianth tubular, lobes 6; stamens 6, inserted at throat of perianth tube, lower parts of filaments united and expanded to form corona; ovary inferior, 1- or 3-locular. Fruits subglobose, embryos apparently absent but seed-like bulbils apparently form in ovary, as bulbils mature the fruit is ruptured irregularly.

3 species, south-eastern Asia and Australia; 3 species Australia; 1 species south-eastern Queensland.

1. *Proiphys cunninghamii* (Aiton ex Lindl.) Mabb.

Eurycles cunninghamii Aiton ex Lindl.; *E. cunninghamii* var. *whittlei* F. M. Bailey
Bulbs *ca* 5 cm diameter. Leaves with petioles 10–25 cm long; blades ovate, apex \pm acute, base rounded or shallowly cordate, 10–25 cm \times 8–13 cm. Umbels with 5–12 flowers, peduncles 25–80 cm long, bracts 1.5–5 cm long, pedicels mostly 2–3.5 cm long; perianth white, tube 0.8–1.2 cm long, lobes 1.5–1.8 cm long; corona white, 1.2–1.6 cm long. Fruits 1.2–2 cm diameter.

Widespread in eastern parts of the region in wet eucalypt forest or in rainforest margins. Flowers spring.

3. ZEPHYRANTHES Herbert

Perennial herbs with bulbs. Leaves annual or perennial. Flowers actinomorphic, solitary on peduncle, bract solitary, spathe-like; perianth segments free or fused into tube with 6 lobes; stamens 6, attached to perianth lobes or segments; ovary inferior, 3-locular. Fruits loculicidal capsules; seeds black, flat.

About 40 species from warmer parts of the Americas and the West Indies; 2 species escaped from garden cultivation in Australia, both occurring in south-eastern Queensland.

1. Perianth white, segments free; stigmas lobed

1. *Z. candida*

Perianth pink, segments united to form basal tube; stigmas divided

2. *Z. grandiflora*

1. **Zephyranthes candida* (Herbert) Herbert

Amaryllis candida Herbert

Leaves twisted, 12–35 cm \times 0.2–0.4 cm. Peduncles up to *ca* 25 cm long, spathe-like bract *ca* 2.5 cm long, pedicels *ca* 1.5 cm long; perianth white, segments free, 3–5 cm long; filaments inserted at base of perianth.

Native of South America; cultivated as an ornamental, naturalized in a few places in eastern parts of the region. Flowers spring–summer.

2. **Zephyranthes grandiflora* Lindl.

Leaves not twisted, 15–45 cm \times 0.3–0.8 cm. Peduncles up to *ca* 20 cm long, spathe-like bract 3–5 cm long, pedicels 1.5–2 cm long; perianth pink, segments united to form basal tube *ca* 1.5 cm long, lobes 4–6 cm long; filaments inserted at throat of perianth tube.

Native of Mexico; cultivated as an ornamental, naturalized in a few places in eastern parts of the region. Flowers spring–summer.

4. CRINUM L.

Perennial herbs with bulbs, bulbs sometimes extended into a neck to form a pseudostem. Leaves arising \pm at ground level. Inflorescences pedunculate umbels or reduced to 1 flower, peduncles sometimes arising beside leaves, involucre bracts 2, spathe-like, floral bracts numerous; flowers actinomorphic; perianth tubular, lobes 6; stamens 6; ovary inferior, 3-locular. Fruits indehiscent.

About 100 species, tropical and subtropical parts of the world; *ca* 5 species Australia, 4 endemic; 3 species south-eastern Queensland.

- | | | |
|---|----------------------------|---|
| 1. Mature flowers and fruits sessile or with pedicels less than 1.5 cm long | 1. <i>C. angustifolium</i> | 2 |
| Mature flowers and fruits with pedicels 1.5 cm or more long | | |
| 2. Leaves up to 5 cm wide; perianth lobes not decurving, spreading | 2. <i>C. flaccidum</i> | |
| Leaves more than 5 cm wide; perianth lobes decurving | 3. <i>C. pedunculatum</i> | |

1. *Crinum angustifolium* R. Br.**FIELD LILY**

Crinum brisbanicum F. M. Bailey; *C. asiaticum* auct. non L., Benth.

Bulbs without pseudostems. Leaves few, weak and spreading, 30–100 cm \times 3–6 cm. Inflorescences up to 1 m tall, bracts up to 10 cm long; flowers 4–14, white, scented, pedicels absent or up to 1.5 cm long; perianth tube 7–13 cm long, lobes 5–8 cm long; filaments maroon, 3.5–6 cm long, anthers purple or black, 0.6–1.2 cm long.

Widespread in eastern parts of the region, usually near rivers or streams or seasonally inundated areas. Flowers mostly summer–autumn.

2. *Crinum flaccidum* Herbert**MURRAY LILY**

Crinum pestilens F. M. Bailey; *C. luteolum* Traub & Hann. ex Traub

Bulbs without pseudostems. Leaves several, weak and spreading, 30–80 cm \times 1–5 cm. Inflorescences up to 75 cm tall, bracts up to 16 cm long; flowers 5–16, white, with strong often unpleasant scent, pedicels 1.5–7 cm long; perianth tube 2–11 cm long, lobes 3.5–10 cm long; filaments pink to purple, 2.5–5.5 cm long, anthers yellow, 0.4–1.2 cm long.

Widespread in the region, usually on floodplains. Flowers mostly summer–autumn.

3. *Crinum pedunculatum* R. Br.**SWAMP LILY; RIVER LILY**

Crinum brachyandrum Herbert; *C. douglasii* F. M. Bailey; *C. taitensis* DC. var. *queenslandicum* Domin

Bulbs with pseudostems up to *ca* 45 cm long. Leaves numerous, robust, erect or spreading, mostly up to *ca* 100 cm \times 10 cm, occasionally longer and wider. Inflorescences up to 1.5 m long, bracts up to 16 cm long; flowers 10–40, white, scented, pedicels 1.5–5 cm long; perianth tube 3–9.5 cm long, lobes 4–8.5 cm long; filaments pink to purple, 2.5–6.5 cm, anthers purple to black, 1–2.5 cm long.

Widespread along riverbanks and creekbanks on swampy areas in coastal parts of the region. Flowers mostly summer–autumn.

169. HYPOXIDACEAE

Herbaceous perennials with tuberous rhizome or corm covered with membranous or fibrous tunic. Leaves basal. Inflorescences subsessile and spicate or scapose and corymbose racemose, sometimes 1-flowered; flowers actinomorphic, bisexual or male; perianth free above ovary or connate into tube, segments 4–6, equal; stamens 4–6; ovary inferior; ovules numerous. Fruits capsules or succulent and indehiscent.

7 genera with 150 species, cosmopolitan; 3 genera with 12 species Australia; 2 genera with 4 species south-eastern Queensland.

- | | |
|---|---------------------|
| 1. Leaf blades less than 5 mm broad, linear; inflorescences scapose, conspicuous | 1. <i>Hypoxis</i> |
| Leaf blades more than 5 mm broad, tapered at both ends; inflorescences subsessile, inconspicuous amongst leaf bases | 2. <i>Curculigo</i> |

1. HYPOXIS L.

Cormous perennials. Leaves clustered, basal; blades flat or terete, sheaths papery. Scapes erect, bracteolate; flowers solitary or 2–9 in corymbose racemes; perianth persistent, lobes 4–6; stamens inserted on base of lobes. Fruits capsules, crowned by persistent perianth, dehiscing by apical rupture.

About 150 species, America, Africa, eastern Asia, Indonesia and Australia; 10 species endemic in Australia; 2 species south-eastern Queensland.

- | | |
|--|---|
| 1. Seeds with conspicuous, basally expanded beak and usually false-arillate, up to 3.5 mm long and with finely granular testa | 1. <i>H. arillacea</i> |
| Seeds with short beak tapering to base and lacking false aril, less than 2.5 mm long, with testa covered with rounded or pointed bumps | 2 |
| 2. Growing corm length \pm equalling or less than width; roots basal on growing corm; flowers 3–9 per scape | 2. <i>H. pratensis</i> |
| Growing corm length much greater than width; roots medial on growing corm; flowers 1 or 2, rarely 3 per scape | 3. <i>H. hygrometrica</i> var. <i>villosisepala</i> |

1. *Hypoxis arillacea* R. Henderson

Corms and roots not known. Leaf blades linear, flat, 15–40 cm \times 0.15–0.4 cm, sparsely hairy. Inflorescences 2–6 together, 3–25 cm tall, 1–4-flowered, pedicels 0.4–3 cm long; perianth lobes greenish yellow outside, yellow inside, 0.9–2.3 cm long, glabrous. Capsules narrowly top-shaped to ellipsoid; seeds dark brown, shiny.

Known in the region from near Lake Broadwater in the Darling Downs district. Flowers spring to early autumn.

2. *Hypoxis pratensis* R. Br.**GOLDEN WEATHERGRASS**

Hypoxis hygrometrica Labill. var. *pratensis* (R. Br.) Benth.

Corms condensed, annual, tunic papery or fibrous; roots tuberous. Leaf blades linear, flat, 3.5–40 cm \times 0.1–0.35 cm, sparsely hairy. Inflorescences 2–8 together, 4–35 cm tall, usually 3–9-flowered, pedicels 0.7–3 cm long; perianth lobes yellow, 0.7–1.2 cm long, hairy outside. Capsules globular to narrowly top-shaped; seeds red-brown, dull.

Two varieties occur in the region:

- | | |
|--|---|
| 1. Anthers up to 2 mm long; seeds covered with small bumps | <i>H. pratensis</i> var. <i>pratensis</i> |
| Anthers more than 2 mm long; seeds tuberculate | <i>H. pratensis</i> var. <i>tuberculata</i> |

Both *H. pratensis* var. *pratensis* and *H. pratensis* var. *tuberculata* R. Henderson are widespread in the region east of the Great Dividing Ra. though the latter is less common. Both often occur in damp areas. Flowers most of the year except winter.

3. *Hypoxis hygrometrica* Labill. var. *villosisepala* R. Henderson**GOLDEN WEATHERGRASS**

Corms cylindrical, perennial, tunic papery; roots fleshy-fibrous. Leaf blades linear, flat or angular, 6–20 cm \times 0.05–0.4 cm, sparsely hairy. Inflorescences solitary or 2–5 together, 2–20 cm tall, usually 2-flowered, pedicels 0.8–3 cm long; perianth lobes bright yellow, 0.7–1.5 cm long, moderately hairy outside. Capsules ellipsoid; seeds dark brown, glossy.

Known from granite areas in southern Darling Downs district. Flowers spring.

The completely glabrous *Hypoxis glabella* R. Br. has been reported from the region but that species does not occur in Queensland.

2. CURCULIGO Gaertn.

Tufted cormose perennials. Leaves clustered, basal, sometimes pseudopetiolate; blades flat or plicate, sheaths papery. Inflorescences spicate, sessile, axillary, 1–10-flowered; perianth persistent, base fused with base of style into slender column, lobes 6; stamens attached to base of stylar limb. Fruits capsule-like, indehiscent or dehiscent by irregular rupture.

10 species throughout tropics and subtropics; 1 species Australia, occurring in south-eastern Queensland.

1. *Curculigo ensifolia* R. Br.

Plants 10–15 cm tall; corms vertically elongated; roots fleshy-fibrous. Leaves sessile or pseudopetiolate, 10–70 cm long; blades tapered to both ends, 0.5–1.8 cm wide, \pm hairy, folded or pleated. Spikes bracteate, lowest bract 2–6.5 cm long, sheathing spike; perianth tubes filiform, 1.5–3 cm long, hairy, lobes yellow, 0.5–1.2 cm long. Seeds black, shiny, rostrate.

In damp areas in eastern parts of the region; not common. Flowers summer–autumn.

170. DIOSCOREACEAE

Dioecious, usually climbers or twiners with tuberous rhizome or thick woody rootstock. Leaves alternate or opposite, usually petiolate; blades often cordate, entire or digitately divided, \pm digitately nerved. Inflorescences spikes, racemes or panicles; flowers small, unisexual, actinomorphic; perianth of 6 lobes in 2 series; stamens 6 in 2 series, inner series sometimes staminodal, or all stamens sterile; ovary inferior, 3-locular, stigmas 3. Fruits 3-valved capsules or berries; seeds often winged.

6 genera with *ca* 750 species, tropical and warm temperate areas; 1 genus with 5 species Australia; 1 genus with 2 species south-eastern Queensland.

1. DIOSCOREA L.

Underground rhizomes often tuberous; stems twining and often twisted. Leaves alternate or opposite, net veined. Stamens 6 in Australian species. Fruits capsules, valves wing-like or capsules lobed; seeds winged.

About 600 species mainly tropical and subtropical parts of the world; 5 species Australia, 2 endemic; 2 species south-eastern Queensland.

The underground tubers are usually called YAMS.

1. Stems not 4-angled or 4-winged	.	.	.	.	.	.	.	1. <i>D. transversa</i>
Stems 4-angled or 4-winged	.	.	.	.	.	.	.	2. <i>D. alata</i>

1. *Dioscorea transversa* R. Br.

Slender glabrous twiner; stems up to several metres long. Leaves with petioles usually 1–9 cm long; blades triangular-hastate or ovate-cordate, apex acuminate, margin entire, 4–13 cm \times 1–11 cm, nerves 5–9, longitudinal, prominent. Male flowers in interrupted spikes 3–6 cm long, spikes often arranged in axillary panicles, perianth segments 1.5–2.5 mm long; female flowers in racemes 5–20 cm long, perianth segments orbicular, mostly smaller than male segments. Capsules with wing-like valves, up to 3.5 cm long and up to 4 cm from tip to tip of wings; seeds 5–6 mm long, wing 0.3–1.2 cm wide.

Mostly in coastal or subcoastal rainforest but also known from further inland; common. Flowers and fruits mostly summer but found all year round.

2. **Dioscorea alata* L.**GREATER YAM**

Glabrous twiner; stems up to several metres long. Leaves with petioles 3–18 cm long, winged; blades ovate, apex acuminate, base cordate, 5–27 cm \times 3–17 cm, nerves 5–9, longitudinal, prominent. Male flowers in spikes 1–3 cm long, spikes often arranged in axillary panicles, perianth segments 1.5–2 mm long; female flowers in racemes up to 60 cm long, perianth similar to males. Capsules with wing-like valves, up to 2.2 cm long and up to 3 cm from tip to tip of wings; seeds not seen.

Native of south-eastern Asia; collected once in the region from northern Moreton District, but probably not truly naturalized in the region. Flowers and fruits mostly summer.

171. PONTEDERIACEAE

Mostly perennial, freshwater aquatics. Leaves floating or emergent; petioles sheathing at base, with numerous air channels. Inflorescences spikes, racemes or panicles, subtended

by 1 or 2 tubular or spathe-like sheaths, bracts minute or absent; flowers bisexual, actinomorphic or zygomorphic; perianth segments 6, petaloid; stamens mostly 6; ovary superior. Fruits capsules, 3-valved or indehiscent.

About 7 genera with 30 species, warmer parts of the world except Europe; 3 genera with 4 species Australia; 2 genera with 2 species south-eastern Queensland.

- | | |
|--|----------------------|
| 1. Plants mostly floating; perianth zygomorphic, segments 2–4 cm long | 1. <i>Eichhornia</i> |
| Plants rooted in the substrate; perianth actinomorphic, segments up to 1 cm long | 2. <i>Monochoria</i> |

1. EICHHORNIA Kunth

Floating or creeping, rooting from nodes. Leaves in rosettes or alternate; petioles spongy, often inflated and acting as floats. Inflorescences terminal spikes or racemes; perianth \pm zygomorphic, funnel-shaped, 6-lobed. Fruits 3-valved capsules; seeds many.

7 species, mostly South America; 1 species naturalized Australia, occurring in south-eastern Queensland.

1. **Eichhornia crassipes* (Mart.) Solms-Laub.

WATER HYACINTH

Pontederia crassipes Mart.; *Eichhornia speciosa* Kunth

Glabrous, stoloniferous; roots plumose, 2–100 cm long, hanging in the water. Petioles from *ca* 3 cm long and swollen and spongy to *ca* 30 cm long and slender; leaf blades broadly ovate to elliptic or orbicular, very variable in size, mostly 2–10 cm \times 2–9 cm. Spikes up to *ca* 15 cm long, often less; perianth tube 1–2 cm long, lobes lilac-mauve, upper lobe marked yellow and blue, lobes *ca* 2–4 cm long. **Fig. 7A.**

Native of tropical America; naturalized in region. Flowers summer–autumn. In Queensland it is a declared noxious weed under the Local Government Act 1936–1976.

The species forms dense masses of vegetation in still or slow moving bodies of water and can be a serious pest of waterways. Rotting vegetation can foul creeks and stock tanks making the water unfit for consumption by both humans and stock.

The exact date of introduction to Queensland is not known but by 1897 it was recognized as a weed with pest potential, by 1900 it was widespread in Queensland and by 1901 the plant was a serious pest in many rivers and streams.

2. MONOCHORIA C. Presl

Attached, glabrous; rootstock creeping; stems \pm erect, each bearing a single leaf. Leaves radical or cauline on long petioles. Inflorescences racemes or spikes, arising at junction of stem and petiole of cauline leaf, subtended by bract, enclosed in basal sheath of petiole; perianth actinomorphic, segments \pm free. Fruits 3-valved ellipsoid capsules; seeds numerous.

3 species, Africa, Asia and Australia; 2 species Australia; 1 species south-eastern Queensland.

1. *Monochoria cyanea* (F. Muell.) F. Muell.

Limnostachys cyanea F. Muell.

Radical leaves on petioles up to *ca* 30 cm long; blades narrowly elliptic to broadly ovate, acuminate, 4–14 cm \times 1–5.5 cm; cauline leaves sometimes smaller, on petioles up to *ca* 10 cm long. Inflorescences up to *ca* 13 cm long, 3–10-flowered, peduncles up to *ca* 26 cm long; perianth blue, 1–2 cm long. Capsules 0.9–1.5 cm long. **Fig. 7B.**

Widespread in permanent water or sometimes in seasonal waterholes. Flowers summer–autumn.

Pontederia cordata L. was reported as naturalized near Brisbane by F. M. Bailey “Qd Fl.” 5: 1644 (1902), however there are no specimens of naturalized plants in the Queensland Herbarium and there are now no known naturalized populations in the region.



Fig. 7 PONTEDERIACEAE — A *Eichhornia crassipes*, flowering plant $\times \frac{1}{2}$; B *Monochoria cyanea*, part of flowering plant $\times \frac{1}{2}$.

172. IRIDACEAE

Perennial herbs with underground rhizomes, corms or bulbs; stems clustered or solitary. Leaves often crowded at base of scape, mostly linear, sheathing at base. Flowers bisexual, actinomorphic or zygomorphic, arranged in spikes, racemes or cymes within spathaceous bracts or solitary; perianth of 6 segments, free or united below into tube, segments in 2 series; stamens 3, opposite outer perianth segments, filaments free or partially connate, anthers 2-locular; ovary inferior, very rarely superior, 3-locular with axile placentation or 1-locular with 3 parietal placentas, ovules numerous, style slender, mostly 3-branched. Fruits capsules, loculicidally dehiscent.

About 85 genera with *ca* 1500 species from tropical and temperate regions of the world; 29 genera with 79 species Australia; 11 genera with 14 species south-eastern Queensland.

- | | | |
|--|------------------------|----|
| 1. Inflorescences consisting of a solitary flower | 1. <i>Romulea</i> | 2 |
| Inflorescences of more than one flower | | |
| 2. Inflorescences of 1 or more cymes each subtended by 1 or 2 bracts | | 3 |
| Inflorescences spikes, each flower subtended by 2 bracts | | 5 |
| 3. Inflorescences consisting of an involucre of 2 bracts enclosing 2 cymes each with 1-6 flowers; perianth blue-violet or violet in south-eastern Queensland | 2. <i>Patersonia</i> | |
| Inflorescences of cymes of 2-several flowers emerging from 1 or 2 bracts; perianth white, cream or yellow in south-eastern Queensland | | 4 |
| 4. Perianth segments spreading from base; stamens exserted | 3. <i>Libertia</i> | |
| Perianth segments forming a cup below, spreading above; stamens included | 4. <i>Sisyrinchium</i> | |
| 5. Style branches deeply bifid | | 6 |
| Style branches entire | | 8 |
| 6. Flowers in \pm distichous spikes | 5. <i>Watsonia</i> | |
| Flowers in one-sided spikes | | 7 |
| 7. Perianth tube curved; perianth white to yellow in south-eastern Queensland | 6. <i>Freesia</i> | |
| Perianth tube straight; perianth red, pink or pale blue in south-eastern Queensland | 7. <i>Anomatheca</i> | |
| 8. Perianth tube straight | | 9 |
| Perianth tube curved | | 10 |
| 9. Perianth tube narrowly cylindrical | 8. <i>Ixia</i> | |
| Perianth tube funnel-shaped | 9. <i>Tritonia</i> | |
| 10. Scares unbranched; bracts herbaceous | 10. <i>Gladiolus</i> | |
| Scares branched; bracts scarious | 11. <i>Crocasmia</i> | |

1. ROMULEA Maratti

Herbs with corms and annual leaves; scapes unbranched, 1-several, shorter than leaves. Leaves few, basal. Flowers solitary, 1 per scape with 2 bracts enclosing ovary; perianth actinomorphic, tube short, lobes equal; style 3-branched, branches deeply bifid.

About 90 species Africa, Mediterranean region and south-western Europe; 4 species naturalized Australia; 1 species south-eastern Queensland.

1. **Romulea rosea* (L.) Ecklon var. *australis* (Ewart) De Vos

ONION GRASS;
GUILFORD GRASS

Romulea cruciata Ker-Gawl. var. *australis* Ewart; *R. longifolia* (Salisb.) Baker; *R. bulbocodium* (L.) Sebast. & Mauri var. *cruciata* (Ker-Gawl.) Ewart

Herb up to *ca* 45 cm tall; corms *ca* 1-2 cm diameter. Leaves 8-35 cm \times 0.1-0.25 cm.

Scapes 3–12 cm long, bracts 1–1.5 cm long; perianth pink or white with yellow tube, tube 2–4 mm long, lobes 1–1.8 cm long. Capsules *ca* 1 cm long.

Native of South Africa; naturalized in south-eastern Darling Downs district. Flowers spring.

2. *PATERSONIA* R. Br.

Perennial herbs usually with short rhizomes; scapes unbranched. Leaves basal or cauline. Inflorescences consisting of an involucre of 2 bracts enclosing 2 cymes each with 1–6 flowers, cymes separated by shorter bracts; perianth actinomorphic, tube \pm included in bracts, outer segments broad, spreading, inner segments small, erect; style unbranched, lobes 3. Capsules \pm included in bracts.

About 19 species, *ca* 2 Malesia and 17 endemic in Australia; 3 species south-eastern Queensland.

- | | | |
|---|-----------------------|---|
| 1. Leaves cauline; filaments completely connate | 1. <i>P. glabrata</i> | |
| Leaves basal; filaments connate for all or part of length | | 2 |
| 2. Bracts green to pale brown, similar in texture to leaves; filaments \pm completely connate | 2. <i>P. fragilis</i> | |
| Bracts blackish, of different texture to leaves; filaments connate for <i>ca</i> $\frac{2}{3}$ length | 3. <i>P. sericea</i> | |

1. *Patersonia glabrata* R. Br.

Tufted subshrub up to 80 cm tall; stems woody. Leaves flat, 10–40 cm \times 0.2–0.5 cm, glabrous except margin minutely tomentose near base. Outer bracts dark brown, 4–6.5 cm long, dissimilar to leaves in texture, sparsely sericeous, glabrescent, margin scarious, pale; perianth tube 4–5 cm long, outer segments pale violet, 2–3 cm \times 1.5–2.6 cm; filaments completely connate. Capsules cylindrical, 2–4 cm long. **Fig. 8B.**

Widespread in the Moreton and Wide Bay districts, also known from south-eastern Darling Downs district, usually on sandy soils in coastal communities or on soils derived from sandstone or granite in open forest communities. Flowers spring.

2. *Patersonia fragilis* (Labill.) Aschers. & Graebner

SWAMP IRIS

Genosiris fragilis Labill.; *Patersonia glauca* R. Br.

Tufted herb up to 50 cm tall. Leaves flat, 20–60 cm \times 0.1–0.6 cm, glabrous. Outer bracts green to pale brown, 2.5–4.5 cm long, similar to leaves in texture, margin scarious, usually dark brown; perianth tube 2.5–3.5 cm long, segments pale violet to dark violet, 1.2–2.5 cm \times 1–1.5 cm; filaments \pm completely connate. Capsules cylindrical, 2.5–3 cm long.

Coastal parts of the Moreton and Wide Bay districts on sandy soils; not common. Flowers spring.

3. *Patersonia sericea* R. Br.

Densely tufted herb up to 50 cm tall. Leaves flat or terete, 15–50 cm \times 0.15–0.6 cm (in Queensland), glabrous except margin tomentose to pubescent (in Queensland) and glabrescent. Outer bracts blackish, 3.5–6 cm long (in Queensland), dissimilar to leaves in texture, white silky hairy, glabrescent, margin scarious, dark; perianth tube 1.5–3 cm long, outer segments blue-violet, 2–3 cm \times 1.5–2.5 cm; filaments connate for *ca* $\frac{2}{3}$ length. Capsules ovoid-cylindrical, 1.5–2.5 cm long.

Widespread in coastal areas on sandy soils and also in the Darling Downs district on soils derived from granite or sandstone. Flowers winter–spring.

3. *LIBERTIA* Sprengel

Herbs with rhizomes, evergreen. Leaves many, basal. Inflorescences compound, of several fan-shaped cymes each in a bract; perianth actinomorphic, segments free, outer usually smaller than inner; stamens united at base (in Australian species) or free; styles deeply 3-branched, branches entire.

About 12 species New Guinea, Australia, New Zealand and South America; 2 species Australia, 1 endemic; 1 species south-eastern Queensland.

1. *Libertia paniculata* (R. Br.) Sprengel*Renealmia paniculata* R. Br.

Densely tufted, up to 60 cm tall. Leaves mostly 24–60 cm \times 0.3–1.2 cm. Inflorescences of many flowers, bracts 1–4 cm long, bractoles 5–8 mm long; perianth whitish, outer segments 5–8 mm long, inner segments 0.8–1.5 cm long. Capsules 4–8 mm long. **Fig. 8A.**

Known from a few places in southern Moreton and south-eastern Darling Downs districts; locally common. Flowers spring.

4. SISYRINCHIUM L.

Annuals or rhizomatous perennials; scapes simple or branched. Leaves basal and cauline. Inflorescences of 1–several fan-shaped cymes each with 2–7 pedicellate flowers emerging from paired bracts; perianth actinomorphic, segments in 2 series, \pm free, outer series forming cup around stamens; styles 3-branched, branches entire.

About 100 species North and South America; 2 species naturalized Australia, both occurring in south-eastern Queensland.

- | | | | |
|--|---|---|--------------------------|
| 1. Flowers 0.5–0.7 cm diameter; capsules 2–3 mm diameter | . | . | 1. <i>S. sp. 1.</i> |
| Flowers 1–2 cm diameter; capsules 3–6 mm diameter | . | . | 2. <i>S. iridifolium</i> |

1. **Sisyrinchium* sp. 1.**SCOURWEED**

Sisyrinchium micranthum ? auct. non Cav., Benth. (*S. sp. A.* of "Fl. Australia" 46: 9 (1986))

Tufted annual herb up to *ca* 20 cm tall; scapes simple or branched, 2-angled. Leaves 2–6 cm \times 0.1–0.2 cm. Cymes 3–7-flowered, outer bracts 1.8–3 cm long, inner bracts 1.5–2.5 cm long; perianth yellow with brownish markings, segments 2–3 mm long. Capsules 2–3 mm diameter.

Probably native of South America; naturalized and widespread in the region, often as a weed in disturbed areas, gardens, etc. Flowers spring–summer. Reputed to be toxic to stock.

2. **Sisyrinchium iridifolium* Kunth**BLUE PIGROOT***Sisyrinchium bermudiana* auct. non L.

Tufted annual or perennial with rhizome, up to 60 cm tall; scapes usually branched, flattened to winged. Leaves 5–22 cm \times 0.2–0.6 cm. Cymes 2–5-flowered, bracts \pm equal, 1.5–5 cm long; perianth white to cream with purplish or bluish centre, segments 4–9 mm long. Capsules 3–6 mm diameter.

Native of South and Central America; apparently naturalized in south-eastern Darling Downs district, in disturbed areas. Flowers spring–summer.

5. WATSONIA Miller

Perennial herbs with corms and annual leaves; scapes simple or branched. Leaves mostly basal. Inflorescences spikes of sessile flowers, \pm distichous, each flower enclosed by 2 bracts; perianth actinomorphic to zygomorphic with a distinct tube; styles 3-branched, branches bifid.

About 45 species from southern Africa, several species widely cultivated as ornamentals; 6 species naturalized Australia; 1 species south-eastern Queensland.

1. **Watsonia bulbifera* J. Mathews & L. Bolus **BUGLE LILY; WILD WATSONIA***Watsonia meriana* auct. non Miller; *W. angusta* auct. non Ker-Gawl.

Herb mostly 1–2 m tall; corms 4–8 cm diameter; scapes unbranched. Leaves 50–80 cm \times 2–4.5 cm. Spikes with flowers 3–4 cm apart, bracts 1.5–2.2 cm long; perianth red to pink, tube 3.5–4.5 cm long, lobes 1.5–2.5 cm \times 1.2–1.4 cm. Bulbils in clusters of 4–12 replacing flowers in lower bracts. Capsules not seen.

Native of South Africa; probably introduced as an ornamental, possibly naturalized in south-eastern Moreton district. Flowers spring–early summer. It is a declared noxious weed in Western Australia and Victoria.

6. FREESIA Klatt

Herbs with corms and annual leaves. Scapes unbranched. Leaves mostly basal. Inflorescences one-sided spikes, flowers subtended by bracts; perianth zygomorphic, tube curved, abruptly widened above, lobes shorter than tube; styles 3-branched, branches bifid.

11 species southern Africa; several species and several hybrids cultivated as ornamentals; 1 hybrid naturalized Australia, occurring in south-eastern Queensland.

1. *Freesia hybrid**FREESIA**

Herb up to 40 cm tall; corms *ca* 1.5 cm wide. Leaves 4–8, 8–27 cm × 0.4–1 cm. Spikes 3–7-flowered, bracts 4–8 mm long; perianth white to cream with yellow markings, tube 1.5–3.5 cm long, lobes 1–1.5 cm long. Capsules 1–1.5 cm long.

A hybrid of horticultural origin, widely cultivated for its attractive scented flowers; possibly naturalized in the region. Flowers spring.

7. ANOMATHECA Ker-Gawl.

Herbs with corms and annual leaves; scapes often branched. Leaves mostly basal. Inflorescences 1-sided spikes, flowers subtended by bracts; perianth zygomorphic, tube straight; styles 3-branched, branches bifid, recurved.

5 species southern Africa; 1 species naturalized Australia, occurring in south-eastern Queensland.

1. *Anomatheca laxa (Thunb.) Goldblatt

Gladiolus laxa Thunb.; *Anomatheca cruenta* Lindl.; *Lapeirousia laxa* (Thunb.) N. E. Brown

Herbs up to 40 cm tall; corms *ca* 1 cm diameter; scapes unbranched. Leaves 10–35 cm × 0.3–1.5 cm. Spikes 3–7-flowered; bracts 5–7 mm long; perianth red, pink or pale blue, 2–3.3 cm long, lobes 0.7–1.3 cm long. Capsules *ca* 1.2 cm long.

Native of southern Africa; cultivated as an ornamental and possibly naturalized in eastern Moreton district. Flowers spring.

8. IXIA L.

Herbs with corms and annual leaves; scapes well developed, sometimes branched. Leaves few. Inflorescences spikes; flowers enclosed at base by 2 bracts; perianth actinomorphic, tube cylindrical, lobes equal, spreading; styles 3-branched, branches entire, spreading.

About 45 species southern Africa, many species and hybrids cultivated as ornamentals; 4 species naturalized Australia; 1 species south-eastern Queensland.

1. *Ixia maculata L.**YELLOW IXIA**

Herb up to 60 cm tall; corms up to 1.8 cm diameter; scapes unbranched. Leaves 5–8, mostly 10–35 cm × 0.2–0.9 cm. Spikes few-many-flowered, bracts often toothed, 0.8–1.4 cm long; perianth yellowish to orange with reddish or purplish centres, tube 5–8 mm long, lobes 1.5–3 cm long; style branches 3–5 mm long.

Native of South Africa; cultivated as an ornamental, apparently naturalized in a few places around Brisbane. Flowers spring.

9. TRITONIA Ker-Gawl.

Herbs with corms and annual leaves; scapes mostly unbranched. Leaves several, basal. Inflorescences spikes; flowers subtended by bracts; perianth actinomorphic to zygomorphic, tube widened above, lobes longer than tube; style 3-branched, branches entire.

28 species southern Africa; 2 species naturalized Australia; 1 species south-eastern Queensland.

1. **Tritonia lineata* (Salisb.) Ker-Gawl.**LINED TRITONIA***Gladiolus lineatus* Salisb.

Herb up to 60 cm tall; corms up to 2 cm diameter; scapes unbranched. Leaves 7–30 cm \times 0.7–1.8 cm. Spikes 7–15-flowered, bracts 0.8–1.3 cm long; perianth cream with dark veins, tube 1–1.5 cm long, expanded from base, lobes 1.5–2.5 cm long. Capsules not seen.

Native of southern Africa; cultivated as an ornamental, apparently naturalized in south-eastern Darling Downs district. Flowers spring.

10. GLADIOLUS L.

Herbs with corms and annual leaves; scapes unbranched. Leaves 1–several, mainly basal. Inflorescences 1-sided or distichous; flowers subtended by bracts; perianth usually zygomorphic, tube straight to curved, expanded above, lobes sometimes clawed; styles 3-branched, branches entire.

About 180 species Africa, Madagascar, southern Europe and south-western Asia, a number of species and hybrids derived from several species are widely cultivated; *ca* 10 species and 1 hybrid naturalized Australia; 1 hybrid naturalized south-eastern Queensland.

1. **Gladiolus* \times *gandavensis* van Houtte

Herb up to 1.2 m tall; corms up to *ca* 5 cm diameter. Basal leaves up to *ca* 60 cm \times 2.5 cm. Spikes distichous, many-flowered, bracts 4–7 cm long; perianth red, usually with yellow stripes, tube 3–5 cm long, curved, widened at throat, lobes 3–5 cm long. Capsules not seen.

Hybrid of horticultural origin; naturalized in the Moreton and Wide Bay districts.

The Queensland Herbarium has a single specimen from the Moreton district of a *Gladiolus* species with distichous spikes and pink bilabiate flowers; the perianth tube is *ca* 2.5 cm long and the perianth lobes 2–3.5 cm long. It is probably a hybrid of horticultural origin but there is insufficient material for a positive identification.

11. CROCOSMIA Planchon

Herbs with corms and annual leaves; scapes branched. Leaves mostly basal. Inflorescences spikes, bracts small; perianth slightly to strongly zygomorphic, tube \pm curved, lobes subequal or upper lobe larger; style 3-branched, branches entire.

9 species southern Africa; 1 hybrid widely cultivated and naturalized in Australia, including south-eastern Queensland.

1. **Crocasmia* \times *crocosmiiflora* (Lemoine ex Morren) N. E. Brown

Herb up to 60 cm, rarely 100 cm tall, with scaly stolons; corms 2–3 cm diameter. Leaves 6–12, 30–60(–80) cm \times 1–2 cm. Spikes 4–20-flowered, bracts 6–10 mm long; perianth zygomorphic, red-orange, tube slightly curved, 1–1.8 cm long, lobes 1.5–2 cm long, spreading. Capsules 7–10 mm long.

Hybrid of horticultural origin; naturalized in the Moreton district, along moist roadsides and other moist places, possibly elsewhere in the region. Flowers spring.

173. BURMANNIACEAE

Herbs, often slender. Leaves entire, radical or nearly so, sometimes all reduced to scales. Flowers terminal, solitary or several racemously arranged or sometimes several in 2- or 3-branched cymes, bisexual; perianth tubular or campanulate, usually 6-lobed, 3 inner lobes often smaller or sometimes absent; stamens 3 or 6; ovary inferior, style solitary with 3 short branches. Fruits capsules; seeds minute.

17 genera with 125 species from areas bordering the Pacific Ocean; 1 genus with 3 species Australia; 1 genus with 2 species south-eastern Queensland.

1. BURMANNIA L.

Flowers sessile or pedicellate along branches of forked cyme, or reduced to single flower; perianth tubular, 3-winged or 3-angled; anthers 3, sessile or nearly so; ovary 3-locular.

57 species tropics and subtropics; 3 species Australia; 2 species south-eastern Queensland.

- | | | |
|---|-----------|-----------------------|
| 1. Leaves narrowly ovate, acute, 2–15 cm long | | 1. <i>B. disticha</i> |
| Leaves linear-filiform, 0.5–1 cm long | | 2. <i>B. juncea</i> |

1. *Burmannia disticha* L.

Burmannia distachya R. Br.

Stems simple or scarcely branched, erect, mostly 30–60 cm tall. Leaves mostly radical, narrowly ovate, apex acute, 2–15 cm × 0.4–0.9 cm; stem leaves few, smaller than radical ones. Inflorescences 1-forked cymes, up to 8 flowers per branch, each branch 1–5 cm long; perianth blue, 1–2 cm long, *ca* 0.5–0.7 cm wide including wings. **Fig. 8C.**

Mostly in swampy areas near the coast but also known from around Stanthorpe in the Darling Downs district; moderately common. Flowers found all year round except mid-winter.

2. *Burmannia juncea* Solander

Stems very slender, almost filiform, 8–30 cm tall. Leaves few at base of stem, linear-filiform, 0.5–1 cm long; stem leaves few, often reduced to scales. Inflorescences once-forked cymes with 1–4 flowers per branch or flowers solitary; perianth blue, 6–9 mm long, *ca* 5–8 mm wide including wings. **Fig. 8D.**

Known in the region from moist ground from a few localities in the Moreton district. Flowers mostly spring–summer.

174. PHILYDRACEAE

Erect herbs from short rhizomes. Leaves linear, radical or crowded at base of stem. Inflorescences spikes or panicles; flowers bisexual, zygomorphic, mostly solitary in axils of spathaceous bracts; perianth segments 4, 2-seriate; stamens 1; ovary superior, style simple. Fruits capsules.

4 genera with 5 species, south-eastern Asia, New Guinea, Australia; 4 genera with 4 species Australia; 2 genera with 2 species south-eastern Queensland.

- | | | |
|--|-----------|-----------------------|
| 1. Inflorescences simple elongated spikes, sometimes branched at base;
flowers yellow | | 1. <i>Philydrum</i> |
| Inflorescences many-branched panicles; flowers white to pink | | 2. <i>Helmholtzia</i> |

1. PHILYDRUM Banks & Solander ex Gaertn.

Perennials; roots fibrous. Leaves fleshy, mostly basal, ensiform, distichous, base sheathing. Inflorescences terminal spikes, sometimes branched at base; perianth segments many-nerved, outer segments free, reflexed, inner segments ± united at base with filaments, smaller than outer segments. Capsules 3-valved; seeds numerous.

1 species south-eastern Asia and Australia, occurring in south-eastern Queensland.

1. *Philydrum lanuginosum* Banks & Solander ex Gaertn.

FROGSMOUTH

Leaves tapered upwards to fine point, up to 120 cm × 2.5 cm, occasionally longer and wider, glabrous, those of flowering stem reducing upwards to bracts. Inflorescences 20–60 cm long, ± covered with white woolly hairs; flowers up to 25 per spike, sessile in axils of bracts; perianth yellow, up to 1.5 cm long, woolly hairy outside. Capsules *ca* 1 cm long, woolly hairy. **Fig. 8E.**

Margins of dams and streams and in ditches, swamps and waterways in the region; common. Flowers all year round except winter. Cultivated to a limited extent in bog gardens. Suspected of poisoning stock in New South Wales and Queensland but there is no definite evidence.



Fig. 8 A-B IRIDACEAE — A *Libertia paniculata*, flowers $\times 1$; B *Patersonia glabrata*, flower and spathe $\times 1$; C-D BURMANNIACEAE — C-D *Burmannia* spp. — C *B. disticha*, fruiting plant $\times 1$; D *B. juncea*, fruiting plant $\times 1$; E PHILYDRACEAE — *Philydrum lanuginosum*, part of inflorescence $\times \frac{3}{4}$.

2. HELMHOLTZIA F. Muell.

Perennials; roots fibrous. Leaves basal, ensiform, distichous, bases sheathing. Inflorescences erect terminal panicles; perianth segments free, inner smaller than outer. Fruits capsules or indehiscent; seeds numerous.

1 species endemic in northern New South Wales and coastal south-eastern Queensland.

1. *Helmholtzia glaberrima* (J. D. Hook.) Caruel FLAX LILY; HELMHOLTZIA
Philydrum glaberrimum J. D. Hook.; *Orthothylax glaberrimus* (J. D. Hook.) Skottsb.
Glabrous or inflorescences sparsely hairy. Leaves tapering upwards, up to 120 cm × 6 cm, those of flowering stem smaller, veins prominent on each surface. Panicles up to ca 60 cm long; flowers numerous, sessile; perianth white to pink, up to 10 mm long. Capsules ellipsoid, 6–8 mm long, glabrous.

Mainly in the ranges along the border with New South Wales, in rainforest and wet gullies. Flowers all year round except winter.

175. AGAVACEAE

Perennials, usually rhizomatous. Leaves crowded at base or top of stem. Inflorescences racemes, panicles, spikes or thyrses, usually on scape; flowers unisexual or bisexual (in Australia), actinomorphic or slightly zygomorphic; sepals 3 and petals 3, free or united in tube; stamens 6; ovary superior or inferior, 3-locular, ovules 1–many per loculus. Fruits capsules or berries.

About 18 genera with 600 species, tropical and subtropical parts of the world; 7 genera with 18 species Australia; 6 genera with 13 species south-eastern Queensland.

1. Ovary inferior	2
Ovary superior	4
2. Stamens longer than perianth	1. <i>Agave</i>
Stamens shorter than perianth	3
3. Leaves with brown tubular tip; filaments swollen at base	2. <i>Furcraea</i>
Leaves weakly spine-tipped; filaments not swollen at base	3. <i>Doryanthes</i>
4. Leaves spine-tipped	4. <i>Yucca</i>
Leaves not spine-tipped	5
5. Leaves fleshy	5. <i>Sansevieria</i>
Leaves not fleshy	6. <i>Cordyline</i>

1. AGAVE L.

Plants with short stems or stemless. Leaves long-lived, fleshy, spine-tipped, with or without marginal spines. Inflorescences terminal spikes, racemes or panicles; flowers bisexual; perianth segments united at base, petals similar or dissimilar to sepals; stamens exserted; ovary inferior, ovules numerous. Fruits loculicidal capsules.

About 300 species, North and South America; 3 species naturalized Australia, all occurring in south-eastern Queensland.

1. Leaves less than 10 times as long as wide	1. <i>A. americana</i>	2
Leaves 10–20 times as long as wide		
2. Margins of leaves toothed; filaments less than 5 cm long	2. <i>A. vivipara</i>	
Margins of mature leaves usually toothless; filaments 5–6 cm long	3. <i>A. sisalana</i>	

1. **Agave americana* L. CENTURY PLANT
Plants suckering, leafy part of plant ca 1–2 m tall, 2–4 m wide. Leaves light green to glaucous, apex acute with apical spine 3–5 cm long, margin toothed, teeth 5–10 mm long,

whole blade mostly 100–200 cm \times 15–20 cm. Inflorescences panicles with umbellate branches, 5–9 m tall, with flowering branches in upper 2.5–4 m; perianth yellow, funnel-shaped, tube 0.8–2 cm long, sepals and petals unequal, 2–3.5 cm long; filaments 6–9 cm long. Capsules 4–6 cm long.

Native of Mexico; cultivated as an ornamental, naturalized, widespread but not common in the region. Flowers summer.

Two varieties have been recorded for south-eastern Queensland but the distinctions are often not clear and they have not been included here.

2. **Agave vivipara* L.

Agave angustifolia Haw.

Plants suckering, leafy part of plant 1–1.5 m tall, 1.5–3 m wide. Leaves pale green to grey, linear to narrowly ovate, apex acute with apical spine 1.5–3.5 cm long, margin toothed, teeth 2–5 mm long, whole blade mostly 60–120 cm \times 0.3–10 cm. Inflorescences panicles with umbellate branches, 3–5 m tall, with flowering branches in upper 1–1.5 m; perianth greenish yellow, \pm funnel-shaped, tube 0.8–1.6 cm long, sepals and petals unequal, 2–3.5 cm long; filaments 3.5–4.5 cm long. Capsules ca 5 cm long.

Place of origin not known; cultivated as an ornamental, escaped from cultivation in a few places in coastal parts of the region. Flowers summer.

3. **Agave sisalana* Perrine

SISAL; SISAL HEMP

Plants suckering, leafy part of plant 1.5–2 m tall, 2–3 m wide. Leaves green, linear to narrowly ovate, apex acute with apical spine 2–2.5 cm long, margin of mature leaves toothless or occasionally with few teeth, margins of young leaves minutely toothed, whole blade mostly 90–130 cm \times 9–12 cm. Inflorescences panicles with umbellate branches, 5–6 m tall, with flowering branches in upper 2.5–3 m; perianth greenish yellow, urceolate, tube 1.5–1.8 cm long, petals and sepals equal, ca 1.8 cm long; filaments 5–6 cm long. Capsules not seen.

Native of eastern Mexico, cultivated in many parts of the world for its fibre; an escape from garden cultivation in the region; not common. Flowers summer.

2. FURCRAEA Vent.

Plants with short to tall stems. Leaves long-lived, fleshy, weakly spine-tipped, margin with or without teeth. Inflorescences terminal panicles; flowers bisexual, 1–3 in axillary bracts or replaced by bulbils; perianth segments united at base, sepals and petals similar; filaments swollen at base; ovary inferior, ovules numerous. Fruits capsules.

About 20 species tropical America; 2 species naturalized Australia, both occurring in south-eastern Queensland.

- | | | | | | |
|--|---|---|---|---|----------------------|
| 1. Leaf margins toothed for entire length | . | . | . | . | 1. <i>F. selloa</i> |
| Leaf margins without teeth or toothed only in lower half | . | . | . | . | 2. <i>F. foetida</i> |

1. **Furcraea selloa* K. Koch

Plant with stem up to 1 m tall. Leaves dark green with yellow margins in naturalized form, narrowly ovate, apex acute with weak apical spine 5–10 mm long, margin toothed, teeth 7–8 mm long, whole blade mostly 90–130 cm \times 7–15 cm. Inflorescences 6–10 m tall; sepals and petals white above, greenish below, 4–6.5 cm long. Axillary bulbils often present. Capsules not seen.

Native of Columbia; cultivated as an ornamental, escaped from cultivation in a few places.

2. **Furcraea foetida* (L.) Haw.

Agave foetida L.; *Furcraea gigantea* Vent.

Plant with stems up to 50 cm tall. Leaves green, broadly obovate or ovate, apex acute with weak apical spine ca 5 mm long, whole blade mostly 120–150 cm \times 7–16 cm. Inflorescences 6–10 m tall; sepals and petals white above, greenish below, 2.5–3.5 cm long. Axillary bulbils often present. Capsules not seen.

Native of northern South America; escaped from cultivation in a few places in the Moreton district.

3. DORYANTHES Corr.

Large plants with short stems. Leaves radical, numerous, each with brown tubular tip. Inflorescences large scapose terminal thyrses or globular compound racemes; flowers bisexual; sepals and petals united at base into tube; staminal filaments adnate to perianth for *ca* $\frac{1}{2}$ length; ovary inferior. Fruits loculicidal capsules.

2 species endemic in eastern Australia; 1 species south-eastern Queensland.

1. *Doryanthes palmeri* W. Hill ex Benth.

Doryanthes excelsa Corr. var. *palmeri* F. M. Bailey; *D. excelsa* var. *guilfoylei* (F. M. Bailey) F. M. Bailey

Leaves radical, sword-like, up to 3 m \times 0.2 m. Inflorescences thyrses up to 1 m long, scapes up to 5 m long; flowers red or red-brown, 4–6 cm long. Capsules *ca* 9 cm long.

Known from mountains and ranges of the southern Moreton district, usually in wet eucalypt forests. Flowers spring–summer.

4. YUCCA L.

Plants with or without erect woody stems. Leaves long-lived, mostly sword-shaped, fleshy, spine-tipped. Inflorescences terminal racemes or panicles; flowers bisexual, campanulate to globose; perianth segments 6, all similar, free or fused at base; filaments thickened; ovary superior, ovules numerous. Fruits septicidal or loculicidal capsules or indehiscent and spongy.

About 35 species, warmer parts of North America; 1 species naturalized Australia, occurring in south-eastern Queensland.

1. **Yucca aloifolia* L.

Leafy part of plant up to 3 m tall. Leaves bluish grey, apex acute, with terminal spine 1–1.5 cm long, margin denticulate, whole blade *ca* 70–100 cm \times 4–5 cm. Inflorescences panicles 4–6 m tall, with flowering branches in upper 2–3 m, pedicels 2.5–4 cm long; perianth whitish, campanulate, segments free, *ca* 5 cm long. Fruits purple turning black, spongy and indehiscent, 6–8 cm long.

Native of North America; escaped from garden cultivation in a few places in the Darling Downs and Moreton districts.

5. SANSEVIERIA Thunb.

Perennials with short thick rhizomes, often stoloniferous; stems short. Leaves fleshy, margin entire. Inflorescences terminal, simple or paniculate racemes; flowers clustered; sepals and petals united at base into tube; filaments filiform; ovary superior, ovules 3 per loculus. Fruits berries.

About 100 species, arid Africa and southern Asia; 1 species widely cultivated and possibly naturalized Australia, occurring in south-eastern Queensland.

1. **Sansevieria trifasciata* Prain**MOTHER-IN-LAW'S TONGUE**

Stem very short, strongly stoloniferous. Leaves 2–6 per plant, dark green with many lighter transverse bands and pale margin, narrowly ovate, apex acute, 40–175 cm \times 2.5–9 cm. Racemes 40–75 cm tall; perianth greenish white, scented, 2.5–3 mm long. Berries 7–9 mm diameter.

Native of Africa; widely cultivated as an ornamental, escaped from cultivation in few places in the Moreton district. Flowers summer.

6. CORDYLINE Commerson ex R. Br.

Shrubs, erect or sprawling, glabrous; stems woody. Leaves crowded on tips of branches; petioles present or absent, base of petiole sheathing. Inflorescences terminal or lateral

panicles; flowers bisexual; sepals and petals united at base; ovary superior, ovules 2–16 per loculus. Fruits berries.

About 20 species, Africa, south-eastern Asia, New Guinea, Australia, New Zealand and South America; 8 species Australia; 5 species south-eastern Queensland.

1. Petioles not distinct from blade or if petiole distinct then \pm flat or slightly concave; petals longer than sepals 2
 Petioles distinct from blade, grooved or \pm tubular; petals as long as sepals 4
2. Mature fruits black; leaves up to 2 cm wide; petioles not distinct from blades 1. *C. stricta*
 Mature fruits reddish; leaves 2 cm or more wide; petioles distinct from blades 3
3. Inflorescences with several branches per node; margins of lower half of leaf and petiole cartilaginous, irregularly dentate and rough 2. *C. congesta*
 Inflorescences with one branch per node; margins of leaf and petiole smooth 3. *C. rubra*
4. Petioles less than 5 mm wide; leaf blades usually less than 15 cm long, rarely up to 18 cm long 4. *C. murchisoniae*
 Petioles more than 5 mm wide; leaf blades usually 45 cm or more long 5. *C. petiolaris*

1. *Cordyline stricta* (Sims) Endl.

Dracaena stricta Sims

Shrub up to 5 m tall, often branched towards base. Leaves linear-elliptic, not or slightly narrowed into petiole-like section but then petiole-like section flat and not distinct from remainder of leaf, margin smooth, whole leaf 35–50 cm \times up to 3 cm. Panicles 20–40 cm long, scapes 15–30 cm long, pedicels 1.5–2.5 cm long; sepals 4–7 mm long; petals 8–9.5 mm long. Berries black, 1–1.5 cm diameter.

Known from the southern Moreton district in rainforest and wet eucalypt forest. Flowers spring–summer.

2. *Cordyline congesta* (Sweet) Steudel

Charlwoodia congesta Sweet

Shrub up to 3 m tall, sparingly branched. Petioles flat or slightly concave, 10–20 cm long; leaf blades narrowly elliptic, apex acute, base narrowed into petiole, margin of lower half of leaf and petiole cartilaginous, irregularly dentate and rough, 30–40 cm \times 2–4 cm. Panicles 20–35 cm long, scapes 10–30 cm long, pedicels 0.5–1 mm long; sepals 6.5–9.5 mm long; petals 0.85–1.05 cm long. Berries orange-red, 1–1.5 cm diameter.

Known from the southern Moreton district on mountains near the New South Wales border, in or near rainforest. Flowers spring–summer.

3. *Cordyline rubra* Otto & A. Dietr.

Shrub up to 4 m tall, occasionally branched. Petioles flat or slightly concave, 5–20 cm long; leaf blades narrowly elliptic, apex acute, base narrowed into petiole, 15–50 cm \times 3–4.5 cm. Panicles 25–40 cm long, scapes 20–30 cm long, pedicels 1–2 mm long; sepals 8–9 mm long; petals 9–10 mm long. Berries red, *ca* 1 cm diameter.

Found in the eastern Moreton and Wide Bay districts in rainforest and wet eucalypt forest, sometimes on sandy soils. Flowers spring–summer.

4. *Cordyline murchisoniae* F. Muell.

Shrub less than 1 m tall, often with single stem. Petioles grooved above, 4–6 cm long; leaf blades narrowly ovate or narrowly elliptic, apex acute, base abruptly narrowed to petiole, 10–15(–18) cm \times 3–5 cm. Panicles up to 16 cm long, scapes *ca* 8 cm long, pedicels 3–5 mm long; sepals and petals equal in length, 7–9 mm long. Berries red, *ca* 1 cm diameter.

Known from a few places in the Moreton and Wide Bay districts in coastal areas, in rainforest and adjacent open forest. Flowers spring–summer.

5. *Cordyline petiolaris* (Domin) Pedley*Cordyline terminalis* (L.) Kunth var. *petiolaris* Domin

Shrub up to 5 m tall, often branched. Petioles with inrolled margins, 30–50 cm long; leaf blades narrowly elliptic, apex acute but often becoming irregularly frayed, base narrowed into petiole, 45–85 cm \times 6–15 cm. Panicles ca 30 cm long, scapes 30–50 cm long; flowers \pm sessile; sepals and petals equal in length, 6–7.5 mm long. Berries red, 0.7–1 cm diameter.

Eastern parts of the region, in rainforest and wet eucalypt forest; moderately common in the Moreton district, less common elsewhere, also known from the Bunya Mts.

176. SMILACACEAE

Perennials, climbing or straggling, rhizomatous; stems leafy, often with prickles and stipular tendrils. Leaves alternate or opposite, 3–5-nerved. Inflorescences umbels or racemes; flowers unisexual or bisexual; perianth segments 6, equal or subequal, free, in 2 whorls, deciduous; stamens 6 (in Australia) in 2 whorls, anthers 1- or 2-locular; ovary superior, 3-locular, style 3-lobed. Fruits berries; seeds few.

4 genera and 375 species tropical and temperate parts of the world; 2 genera with 12 species Australia; 2 genera with 7 species south-eastern Queensland.

1. Inflorescences umbels; flowers unisexual; anthers 1-locular; tendrils present

1. *Smilax*

Inflorescences racemes or spikes; flowers bisexual; anthers 2-locular; tendrils absent

2. *Ripogonum***1. SMILAX L.**

Tendrils simple, one on each side of petiole, sometimes short. Leaves usually alternate on short petioles; blades leathery, with reticulate venation between longitudinal nerves. Inflorescences axillary umbels; flowers unisexual; perianth segments greenish white, subequal; anthers oblong, 1-locular. Fruits globular berries.

350 species, tropical and subtropical parts of the world; 7 species Australia; 2 species south-eastern Queensland.

1. Leaves narrowly ovate to ovate, glaucous below; perianth segments 2 mm or less long; stems without prickles

1. *S. glycophylla*

Leaves elliptic to almost circular, not glaucous; perianth segments 3–4 mm long; stems usually with prickles

2. *S. australis***1. *Smilax glycophylla* Smith****SWEET SARSAPARILLA**(Sometimes misspelt as '*glyciphylla*')

Glabrous, prickles absent. Petioles 5–10 mm long; leaf blades usually glaucous below, narrowly ovate to ovate, apex acute or acuminate, base narrowed or rounded or rarely almost cordate, 4–12 cm \times 0.8–6.5 cm, 3-nerved. Pedicels 4–6 mm long; perianth segments 2 mm or less long. Fruits black, 6–10 mm diameter.

Widespread and moderately common. Flowers spring–summer.

2. *Smilax australis* R. Br.**AUSTRAL SARSAPARILLA**

Glabrous, stems usually with prickles. Petioles 0.5–1.5 cm long; leaf blades elliptic to almost orbicular, occasionally ovate, apex rounded or mucronate, base cordate or rounded, 4–15 cm \times 2–10 cm, 5-nerved. Pedicels 1.5–2.5 cm long; perianth segments 3–5 mm long. Fruits black, 6–10 mm diameter. **Fig. 9A.**

Widespread and common. Flowers found all year round with main period spring.

2. RIPOGONUM J. R. & G. Forster

Tendrils absent. Leaves mostly opposite or nearly so, sometimes whorled or alternate, 3- or 5-nerved, with transverse reticulate veins. Inflorescences spikes or racemes, either

Rainforest of the McPherson Ra.; rare. Flowers summer.

177. PHILESIACEAE

Shrubs, undershrubs or climbers. Leaves alternate with prominent parallel nerves. Inflorescences terminal or axillary, fasciculate or cymose-racemose or flowers solitary; flowers pendulous, bisexual, actinomorphic; perianth segments free, subequal or outer sepaloid and inner petaloid; stamens 6; ovary superior, style 1. Fruits berries or dehiscent with fleshy valves.

7 genera with 9 species, South America, Pacific Is, New Zealand, Australia, Africa and south-eastern Asia; 2 genera with 2 species Australia; 2 genera with 2 species south-eastern Queensland.

Australian genera placed by some authors in Smilacaceae or Luzuriagaceae.

- | | |
|---|--------------------------|
| 1. Flowers in terminal cymes; inner perianth segments with entire margin;
fruits black | 1. <i>Geitonoplesium</i> |
| Flowers in clusters, mostly axillary; inner perianth segments with
fimbriate margin; fruits orange | 2. <i>Eustrephus</i> |

1. GEITONOPLESIUM Cunn. ex R. Br.

Glabrous much branched leafy climber. Flowers pedicellate, in terminal cymes or cymose panicles; perianth segments 6, equal in length, margin entire, deciduous. Fruits globular berries.

1 species south-eastern Asia, eastern Australia and islands of tropical south-western Pacific Ocean, occurring in south-eastern Queensland.

1. *Geitonoplesium cymosum* (R. Br.) Cunn. ex R. Br.

SCRAMBLING LILY

Luzuriaga cymosa R. Br.

Leaves with petioles 1–5 mm long, sometimes subsessile; blades linear to narrowly ovate to ovate, very variable, apex tapering to fine point or acute-acuminate, 1.5–13 cm × 0.2–4 cm, midvein raised on upper surface. Pedicels 5–10 mm long; perianth segments white, 0.5–1.1 cm long. Fruits black, ca 0.7–2 cm diameter; seeds black. **Fig. 9D.**

Throughout the region, mostly in moist situations near rainforest and in open eucalypt communities; common. Flowers spring to late summer. Cultivated to a limited extent as an ornamental.

2. EUSTREPHUS R. Br. ex Ker-Gawl.

Glabrous much branched leafy climber. Flowers pedicellate, in reduced cymes in upper axils, sometimes appearing terminal; perianth segments 6, equal in length, outer 3 with entire margins, inner 3 with fimbriate margins, deciduous. Fruits ± globular, dehiscent.

1 species New Guinea, Australia and some Pacific Is, occurring in south-eastern Queensland.

1. *Eustrephus latifolius* R. Br. ex Ker-Gawl.

WOMBAT BERRY

Eustrephus angustifolius R. Br.; *E. latifolius* var. *angustifolius* (R. Br.) Benth.; *E. latifolius* var. *intercedens* Domin

Leaves with petioles up to 1 mm long; blades discolourous, narrow-linear to broadly ovate, apex tapering to fine point, 3–11.5 cm × 0.1–4.5 cm, several veins conspicuous on undersurface. Pedicels 0.8–1.8 cm long; perianth segments white or pale pink, 5–8 mm long. Fruits orange, 1–2 cm diameter; seeds black. **Fig. 9C.**

Throughout the region, in open eucalypt communities, depauperate rainforest and rainforest; common. Flowers spring–summer. Cultivated to a limited extent as an ornamental.

178. PETERMANNIACEAE

Tall woody climbers; stems ± prickly. Leaves alternate, exstipulate, shortly petiolate; blades narrowly ovate, apex acuminate or drawn out to long point, midrib conspicuous, 3–5 subparallel nerves and reticulate veins. Inflorescences leaf-opposed lax few-flowered



Fig. 9 A-B SMILACACEAE — A *Smilax australis*, part of stem with inflorescence x 1; B *Ripogonum elseyanum*, part of stem with inflorescence x 1; C-D PHILESIACEAE, C₁-C₂ *Eustrephus latifolius*, C₁ part of stem with flowers x 1, C₂ fruit x 1; D *Geitonoplesium cymosum*, part of stem with inflorescence x 1; E PETERMANNIACEAE — *Petermannia cirrosa*, part of stem with inflorescence x 1.

cymes, sometimes sterile and modified into branched tendrils; flowers bisexual; perianth segments 6, 2-whorled, segments spreading or at length deflexed, subequal; stamens 6, inserted at base of perianth; ovary inferior. Fruits berries; seeds many.

1 genus with 1 species endemic in north-eastern New South Wales and the border ranges of south-eastern Queensland.

Included by some authors in Smilacaceae.

1. PETERMANNIA F. Muell.

Characters as for family.

1. *Petermannia cirrosa* F. Muell.

Petioles 3–5 mm long; leaf blades ovate, apex acute, 3–10 cm × 0.8–5 cm. Inflorescences with few flowers, pedicels 4–6 mm long; perianth white or pinkish, segments 4–7 mm long. Fruits red, 0.6–1.8 cm diameter. **Fig. 9E.**

Known in Queensland only from the McPherson Ra., in rainforest or wet eucalypt communities. Flowers summer.

179. JUNCACEAE

Annual or perennial herbs, often rhizomatous. Leaves mostly in basal tufts, cylindrical to flat, sheathing at base, sheaths open or closed. Inflorescences panicles, cymes, corymbs or heads or occasionally flowers solitary; flowers bisexual or (not in Australia) unisexual and then plants dioecious; perianth segments usually 6 in 2 whorls, or rarely segments 3; stamens 3 or 6, free, opposite perianth segments, anthers 2-locular, basifixed; ovary superior, 1- or 3-locular, ovules numerous, styles 1 or 3, stigmas 3. Fruits capsules, 1–3-locular, loculicidally dehiscent.

9 genera with *ca* 400 species, worldwide but most common in temperate regions; 2 genera with *ca* 65 species Australia; 2 genera with *ca* 15 species south-eastern Queensland.

1. Capsules 3-locular; seeds numerous; leaves glabrous, cylindrical to flat
or reduced to scales
Capsules 1-locular; seeds 3; leaves usually hairy, flat

1. *Juncus*
2. *Luzula*
1. JUNCUS L.
- Annuals or perennials. Leaf sheaths slit to base; leaf blades cylindrical, flat or reduced to sheaths, glabrous. Inflorescences and flowers as in family description, inflorescences with basal bract; ovary ± 3-locular. Capsules 3-locular; seeds numerous, small.
- About 300 species worldwide; *ca* 50 species Australia, many undescribed; 14 species south-eastern Queensland.
1. Main inflorescence bract not extending beyond inflorescence and thus
not appearing to be a continuation of stem
Main inflorescence bract appearing as a continuation of stem and
causing inflorescence to appear ± lateral

2
8

2. Leaves slightly to distinctly transversely septate
Leaves not septate

3
5

3. Leaves compressed with longitudinal and incomplete transverse septa;
stamens 3
Leaves terete (when fresh) or compressed with complete transverse
septa only; stamens 6

1. *J. prismatocarpus*
4

4. Flowers 4–10 per final cluster, dark coloured; capsules 3 mm long,
slightly longer than perianth segments when mature; clearly
rhizomatous
Flowers 1–20 per final cluster, pale coloured; capsules 4–6 mm long,
much longer than perianth segments; shortly rhizomatous

2. *J. articulatus*
3. *J. fockei*

- | | | |
|--|----------------------------|----|
| 5. Annuals, tufted, with fibrous roots, 5–20(–30) cm tall; stems mostly 0.5 mm diameter; flowers mostly solitary on a lengthened rachis; stems, leaves and flowers yellowish green | 4. <i>J. bufonius</i> | 6 |
| Perennials, shortly rhizomatous, 15–60 cm tall; stems more than 0.5 mm diameter; flowers clustered or spaced; stems, leaves and flowers dark green to brown | | |
| 6. Leaves flat, 2–6 mm wide, bases not auriculate; flowers without bracteoles | 5. <i>J. planifolius</i> | 7 |
| Leaves narrow, 1–2 mm wide, bases auriculate; flowers with bracteoles | | |
| 7. Flowers in clusters of 2–6, usually on 2 branches | 6. <i>J. homalocaulis</i> | |
| Flowers not clustered, spaced along 4–10 branches | 7. <i>J. cognatus</i> | |
| 8. Stems with continuous pith | | 9 |
| Stems with interrupted pith | | 10 |
| 9. Leaf blades absent, leaves reduced to sheaths; perianth pale; capsules exceeding perianth | 8. <i>J. continuus</i> | |
| Leaf blades present, perianth dark; capsules as long as perianth | 9. <i>J. kraussii</i> | |
| 10. Stems mostly less than 1.5 mm diameter | | 11 |
| Stems mostly more than 1.5 mm diameter | | 12 |
| 11. Perianth segments 1.3–2 mm long, shorter than capsules; leaf sheaths reddish brown | 10. <i>J. usitatus</i> | |
| Perianth segments 2–4 mm long, longer or shorter than capsules; leaf sheaths yellow or pale coloured | 11. <i>J. subsecundus</i> | |
| 12. Perianth segments mostly less than 2 mm long | 12. <i>J. polyanthemus</i> | 13 |
| Perianth segments 2–3.3 mm long | | |
| 13. Perianth segments 2–2.8 mm long, shorter than or equal to capsule; leaf sheaths pale to medium brown; stems glaucous, green | 13. <i>J. aridicola</i> | |
| Perianth segments 3–3.3 mm long, longer than capsule; stems not glaucous, often yellowish green | 14. <i>J. flavidus</i> | |

1. *Juncus prismatocarpus* R. Br.

BRANCHING RUSH

Perennial; stems loosely tufted, up to 60 cm tall. Leaves basal and cauline; sheaths with 2 auricles at summit; blades compressed, hollow, with longitudinal septa and incomplete transverse septa, 2–5 mm wide. Flowers 6–12 occasionally more, in clusters forming loose cymose panicles, mostly 10–20 cm long; perianth segments pale-coloured, 3–4 mm long; stamens 3. Capsules longer than perianth. **Fig. 10A.**

Widespread in damp areas in the region; moderately common in the Moreton district.

2. **Juncus articulatus* L.

JOINTED RUSH

Perennial, rhizomatous, up to ca 60 cm tall; stems stiff. Leaves mostly cauline; sheaths with 2 auricles at summit; blades compressed, hollow, distinctly transversely septate, ca 1 mm wide. Flowers in clusters of 2–several, forming loose cymose panicles up to ca 15 cm long; perianth segments dark coloured, ca 3 mm long; stamens 6. Capsules slightly longer than perianth. **Fig. 10B.**

Native of Europe, Asia and the Americas; naturalized in a few places in southern Moreton and south-eastern Darling Downs districts.

3. *Juncus fockei* Buchenau

Perennial, shortly rhizomatous, often ± tufted, up to ca 60 cm tall. Leaves basal and cauline; sheaths with ± membranous margin; blades ± terete or compressed, hollow, distinctly transversely septate, ca 2–3 mm wide. Flowers in clusters of 1–many, forming loose cymose panicles up to 15 cm long, or more congested and shorter than subtending bract; perianth segments pale coloured, ca 3 mm long; stamens 6. Capsules much exceeding perianth.

Collected once from the base of Mt Coolum in the Moreton district and once from near Wallangarra in the Darling Downs district.

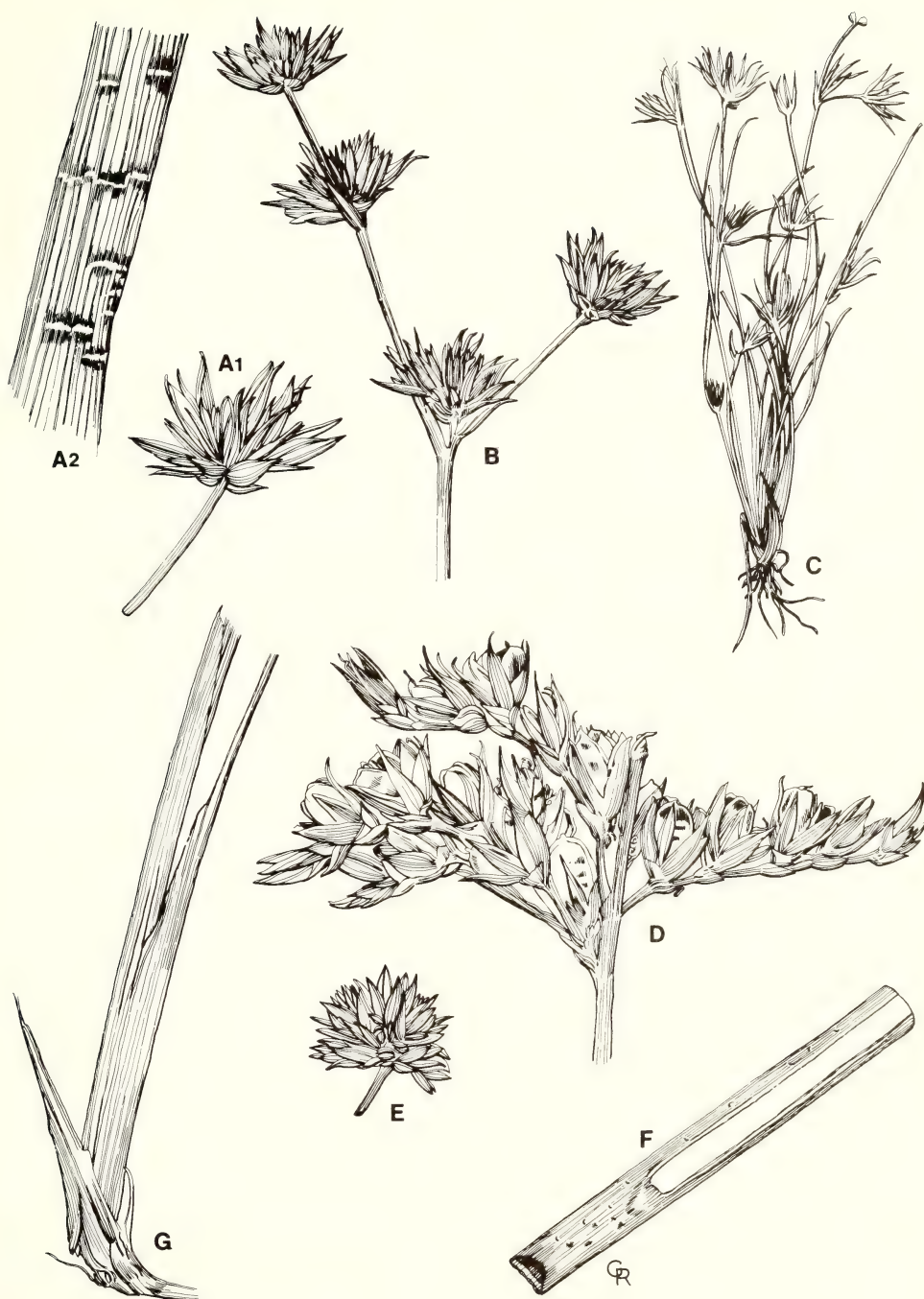


Fig. 10 JUNCACEAE — A–G *Juncus* spp. — A₁–A₂ *J. prismatocarpus*, A₁ spike x 2¼, A₂ incomplete septa in stem x 4½; B *J. articulatus*, portion of inflorescence x 2¼; C *J. bufonius*, fertile plant x ¾; D *J. cognatus*, inflorescence x 2¼; E *J. planifolius*, spike x 2¼; F *J. continuus*, portion of stem showing continuous pith x 2¼; G *J. kraussii*, basal portion of stem showing blade x ¾.

4. *Juncus bufonius* L.**TOAD RUSH**

Annual, tufted, 2–20(–30) cm tall. Leaves few per stem; blades flat, not septate, *ca* 0.5 mm wide. Flowers usually solitary along branches of panicles, occasionally 2–6 in clusters, panicles up to *ca* 12 cm long; perianth segments usually pale coloured, rarely reddish brown, up to 5–7 mm long; stamens 3 or 6. Capsules shorter than perianth. **Fig. 10C.**

Known from damp areas in the vicinity of Brisbane in the Moreton district, eastern Darling Downs district and from Maryborough in the Wide Bay district.

5. *Juncus planifolius* R. Br.**BROAD LEAVED RUSH**

Perennial, rhizomes very short, often tufted, 15–35(–50) cm tall. Leaves basal; blades flat, grass-like, 3–8 mm wide. Flowers ebracteate, 3 or more in globular clusters arranged in umbel-like cymose panicles up to *ca* 10 cm long, occasionally reduced to solitary cluster; perianth segments usually brown, 1.5–2.5 mm long; stamens 3. Capsules as long as perianth. **Fig. 10E.**

Widespread in damp places in southern and eastern Moreton district and south-eastern Darling Downs district.

6. *Juncus homalocaulis* F. Muell. ex Benth.**WIRY RUSH**

Perennial, shortly rhizomatous, often tufted, up to *ca* 35 cm tall. Leaves mostly basal; sheaths with 2 auricles at summit; blades flattened, *ca* 1 mm wide. Flowers bracteate, 2–6 in globular clusters, clusters solitary or in umbel-like cymose panicles up to *ca* 5 cm long, subtending bracts much longer than panicles; perianth segments pale, up to *ca* 6 mm long. Capsules shorter than perianth. **Fig. 11B.**

Known from the vicinity of Stanthorpe in south-eastern Darling Downs district.

7. *Juncus cognatus* Kunth

Perennials, rhizomes short, often tufted, up to *ca* 60 cm tall. Leaves mostly basal; blades filiform, flattened. Flowers not clustered, spaced along 4–10 branches of cymose panicles, each branch up to *ca* 2 cm long but mostly shorter; perianth segments pale, *ca* 3 mm long; stamens 6. Capsules slightly shorter than perianth segments. **Fig. 10D.**

Collected once in the region, from Wallangarra in south-eastern Darling Downs district.

8. *Juncus continuus* L. A. S. Johnson

Perennial, rhizomatous, up to *ca* 1.2 m tall; stems with continuous pith, 1–4 mm diameter. Leaf sheaths basal; blades absent. Inflorescences appearing as lateral panicles up to *ca* 20 cm long, flowers scattered on panicle branches; perianth pale, 1.5–2.5 mm long; stamens usually 3, rarely 6. Capsules exceeding perianth. **Fig. 10F.**

Widespread in damp places in the Moreton district, moderately common, also known from the Wide Bay district and south-eastern Darling Downs district.

9. *Juncus kraussii* Hochst.**SEA RUSH**

Juncus maritimus Lam. var. *australiensis* Buchenau

Perennial, rhizomatous, up to *ca* 1 m tall; stems with continuous pith, 1.5–3 mm diameter. Leaves few, mostly basal; blades present, \pm terete, stem-like but shorter than stems. Inflorescences appearing as lateral panicles up to *ca* 12 cm long, flowers in clusters arranged along panicle branches; perianth dark, *ca* 3 mm long; stamens 6. Capsules *ca* as long as perianth. **Fig. 10G.**

Known from damp areas in the Moreton and Wide Bay districts in areas close to the sea.

10. *Juncus usitatus* L. A. S. Johnson**COMMON RUSH**

Perennial, rhizomatous, mostly 0.3–1.2 m tall; stems with interrupted pith, mostly less than 1.5 mm diameter. Leaves reduced to sheaths, usually dark, blades absent. Inflorescences appearing as lateral panicles up to *ca* 10 cm long; flowers scattered along panicle branches; perianth pale, 1.3–2 mm long; stamens 3. Capsules longer than perianth. **Fig. 11A.**

Widespread in damp places in the region; common in the Moreton district.



Fig. 11 A-D JUNCACEAE — A-D *Juncus* spp. — A *J. usitatus*, portion of inflorescence showing perianth segments shorter than capsules $\times 2\frac{1}{4}$; B *J. homalocaulis*, inflorescence $\times 2\frac{1}{4}$; C *J. polyanthemus*, inflorescence $\times \frac{3}{4}$; D *J. subsecundus*, inflorescence $\times \frac{3}{4}$.

11. *Juncus subsecundus* N. A. Wakefield

FINGER RUSH

Perennial, rhizomatous, mostly 20–90 cm tall; stems with interrupted pith, mostly less than 1.5 mm diameter. Leaves reduced to sheaths, usually pale, blades absent. Inflorescences appearing as lateral panicles up to ca 7 cm long, flowers spaced along branches; perianth pale, 2–4 mm long; stamens 3–6. Capsules shorter than to longer than perianth. **Fig. 11D.**

Widespread in damp places in the Darling Downs district, also known from Mt Tamborine in southern Moreton district.

12. *Juncus polyanthemus* Buchenau

Perennial, rhizomatous, mostly 0.6–1.2 m tall; stems with interrupted pith, mostly more than 1.5 mm diameter. Leaves reduced to sheaths, blades absent. Inflorescences appearing as lateral panicles up to ca 8 cm long, flowers scattered along panicle branches; perianth pale, 1.5–2 mm long; stamens 6. Capsules longer than perianth. **Fig. 11C.**

Widespread in damp places in eastern Moreton and Wide Bay districts.

13. *Juncus aridicola* L. A. S. Johnson

TUSOCK RUSH

Perennial, rhizomatous, mostly 0.6–1 m tall; stems with interrupted pith, mostly 1.5–4 mm diameter. Leaves reduced to sheaths, blades absent. Inflorescences appearing as lateral panicles up to ca 14 cm long, flowers spaced along branches; perianth pale, 2–2.8 mm long; stamens 3–6. Capsules as long as or longer than perianth.

Known from damp areas in western Darling Downs district.

14. *Juncus flavidus* L. A. S. Johnson

Perennial, rhizomatous, mostly 0.4–1.2 m tall; stems with interrupted pith, mostly 1.5–4.5 mm diameter. Leaves reduced to sheaths, blades absent. Inflorescences appearing as lateral panicles up to ca 18 cm long, flowers in clusters along branches; perianth pale, 3–3.3 mm long; stamens 3–6. Capsules shorter than perianth.

Known from a few localities in the Darling Downs district.

There are also possibly at least two undescribed taxa in the region: a strictly dioecious taxon from the Darling Downs district and a taxon which resembles *Juncus continuus* but has glaucous stems and very dark bases to the leaf sheaths. There is insufficient material of these taxa in the Queensland Herbarium for descriptions to be written.

2. LUZULA DC.

Perennials. Leaf sheaths closed; leaf blades flat, usually hairy. Inflorescences terminal cymes sometimes reduced to terminal heads, with leaf-like basal bract; flowers bisexual; perianth segments 6 in 2 whorls; stamens 3 or 6; ovary 1-locular. Capsules 1-locular; seeds 3.

About 80 species, worldwide; 15 species Australia; 1 species south-eastern Queensland.

1. *Luzula flaccida* (Buchenau) Edgar

Luzula campestris (L.) DC. var. *flaccida* Buchenau; *L. meridionalis* Nordensk. var. *flaccida* (Buchenau) Nordensk.

Tufted, 15–25(–30) cm tall. Leaves with thick callus at tip, 2–4 mm wide, sparsely hairy on margin. Inflorescences often umbel-like, flowers in 1–6 clusters, occasionally more; perianth segments pale with brown stripes. Capsules as long as or longer than perianth.

Known from a few places at high altitudes along the Great Dividing Ra. and from near Stanthorpe.

180. COMMELINACEAE

Perennial herbs. Leaves alternate with tubular sheathing bases, nerves parallel. Inflorescences axillary clusters or panicles or cymes; flowers actinomorphic or rarely

Native of Mexico; cultivated for its foliage, naturalized on waste ground around Brisbane and other towns in the region. Flowers mainly spring-summer.

3. TRADESCANTIA L.

Stems erect or trailing. Inflorescences simple cymes, sometimes umbellate or densely paniculate, subtended by 1–3 bracts similar to leaves; flowers \pm pedicellate, many or few together, rarely solitary; stamens 6, all fertile, filaments usually bearded. Fruits capsules.

About 60 species, temperate and tropical America; 1 species naturalized Australia, occurring in south-eastern Queensland.

1. **Tradescantia albiflora* Kunth

Tradescantia fluminensis auct. Aust. non Vell.

Suberect. Leaf sheaths \pm hairy; leaf blades shining, oblong or ovate-oblong, 3–5 cm \times 1–2 cm, often larger in cultivated specimens. Inflorescences terminal umbels, pedicels *ca* 1–5 cm long, \pm hairy; sepals hairy on keel; petals white, *ca* 8 mm long.

Native of South America; cultivated as a garden plant for its variegated foliage. The plant has lost its variegation and become naturalized in several localities in the region, mainly in damp shaded places. The variegated form is a common garden plant. Flowers mainly spring.

4. COMMELINA L.

Weak herbs often creeping at base; stems usually rooting at nodes. Inflorescences axillary, sometimes appearing terminal, in leafy spathes, peduncles in pairs in spathe, one usually with single flower or reduced to bristle, other with 2 or more flowers; sepals 3, unequal; petals 3, \pm unequal; perfect stamens 3, central one larger, staminodes usually 3. Fruiting pedicel recurved so as to ripen capsule within spathe.

230 species, tropical and subtropical; *ca* 6 species Australia; 3 species south-eastern Queensland.

- | | | |
|--|---------------------------|---|
| 1. Spathes not closed at base, two sides folded together lengthwise | 1. <i>C. cyanea</i> | 2 |
| Spathes closed at base, forming an inverted cone, open at top only | | |
| 2. Leaves broadly linear to narrowly ovate, narrowed gradually to fine point | 2. <i>C. ensifolia</i> | |
| Leaves elliptic-ovate, apex obtuse or acute | 3. <i>C. benghalensis</i> | |

1. *Commelina cyanea* R. Br.

WANDERING JEW

Commelina communis auct. non L., F. Muell.; *C. lanceolata* auct. S. E. Qld non R. Br.

Usually glabrous; stems weak, creeping. Leaves very narrowly ovate to ovate, apex acute or acuminate, base often shortly contracted above sheath, 6–10 cm \times 0.4–1 cm. Spathes solitary on slender stipes up to *ca* 3 cm long; petals blue, *ca* 1.2 cm long. Capsules *ca* 5 mm long. **Fig. 12A.**

Throughout the region; common weed. Flowers spring to autumn, mainly autumn.

2. *Commelina ensifolia* R. Br.

SCURVY GRASS; WANDERING JEW

Commelina undulata R. Br.

Glabrous or sparsely pubescent, semi-erect; stems stout. Leaves linear to narrowly-ovate, apex acuminate, base often narrowed above sheath, margin sometimes undulate, 5–12 cm \times 0.4–2 cm. Spathes solitary on stipes 0.5–1.5 cm long; petals blue, *ca* 4 mm long. Capsules *ca* 6 mm long.

Known in the region from a few localities in the Darling Downs district. Flowers spring to autumn, mainly autumn.

3. **Commelina benghalensis* L.

Prostrate or ascending, usually pubescent. Leaves elliptic-ovate, apex obtuse or acute, base contracted above sheath, 3–7 cm \times 1–3 cm. Spathes 1–3 together on short stout stipe; petals blue, 3–4 mm long. Capsules 4–5 mm long.

Native of tropical Asia and Africa; naturalized in the region in a few areas in the Moreton and Burnett districts; not common. Flowers mainly spring to autumn.

5. POLLIA Thunb.

Tall herbs, usually weak and creeping at base. Leaves large. Inflorescences terminal cymose bracteate panicles, primary branches often forming whorls, bracts shorter than flowers; stamens 6, all perfect or perfect stamens 3, grouped together, staminodes 3, grouped together (in Australian species). Fruits usually blue, shining, ovoid or globular nuts, pericarp brittle.

26 species, tropical parts of the world; 2 species Australia, both occurring in south-eastern Queensland.

- | | |
|--|--------------------------|
| 1. Margins of leaf sheaths entire; branches of panicles in whorls | 1. <i>P. macrophylla</i> |
| Margins of leaf sheaths undulate-crisped; branches of panicles not in whorls | 2. <i>P. crispata</i> |

1. *Pollia macrophylla* (R. Br.) Benth.

Aneilema macrophyllum R. Br.; *Aclisia macrophylla* (R. Br.) Brückn.

Stems ascending or erect, up to *ca* 2 m tall. Leaf blades narrowly ovate to ovate, apex acuminate, base tapering above sheath, margin of sheath not undulate-crisped, 10–24 cm × 1–4.5 cm. Panicles shortly pedunculate, branches whorled; perianth blue, sometimes white, *ca* 6 mm long. Fruits blue, *ca* 5–6 mm long.

Throughout the region in rainforest or fringing forest along creeks and streams. Flowers spring to autumn.

2. *Pollia crispata* (R. Br.) Benth.

Aneilema crispatum R. Br.; *Aclisia crispata* (R. Br.) Brückn.

Stems ascending, up to *ca* 1 m tall. Leaf blades narrowly ovate, apex acuminate, base tapering above sheath, margin of sheath undulate-crisped. Panicles ± sessile within last leaf sheath; petals white or blue, 4–6 mm long. Fruits blue, *ca* 5–6 mm long.

Throughout the region in rainforest or fringing forest along creeks and streams. Flowers spring to autumn.

6. ANEILEMA R. Br.

Stems weak, creeping or ascending from a creeping base. Inflorescences loose terminal panicles or of two short branches; flowers zygomorphic; perfect stamens 2 or 3 grouped together, staminodes 2–4 grouped together, filaments glabrous. Fruits capsules, 2-valved.

About 52 species, mostly tropical and subtropical areas of America, Africa and Asia; 3 species Australia; 2 species south-eastern Queensland.

- | | |
|---|-------------------------|
| 1. Inflorescences of slender panicles usually much exceeding last leaves | 1. <i>A. acuminatum</i> |
| Inflorescences of two short branches each bearing 2 flowers, rarely exceeding last leaves | 2. <i>A. biflorum</i> |

1. *Aneilema acuminatum* R. Br.

Stems from creeping base, up to *ca* 30 cm tall. Leaf blades discolourous, narrowly ovate to ovate, apex acute to acuminate, base narrowed above sheath, mostly 3–8 cm × 1–2 cm, sometimes larger. Panicles up to 15 cm long, pedicels filiform, 2–8 mm long; sepals 2–4 mm long; petals white, 4–6 mm long; fertile stamens 2 or 3, staminodes 3. Capsules flattened, *ca* 4 mm long; seeds tuberculate-rugose.

Found throughout eastern parts of the region, in moist shaded areas, often in or near rainforest. Flowers summer–autumn.

2. *Aneilema biflorum* R. Br.

Stems from creeping base, up to *ca* 20 cm tall. Leaf blades discolourous, narrowly ovate to ovate, apex acute, base distinctly narrowed above sheath, 2–5 cm × 0.5–1.5 cm. Inflorescences rarely exceeding last leaf, usually of 2 short branches each bearing 2 flowers, pedicels filiform, up to *ca* 6 mm long; sepals 2–3 mm long; petals white, 2–4 mm long; fertile stamens 3, staminodes 3. Capsules flattened, *ca* 4 mm long; seeds rugose.

Moreton and Wide Bay districts, mostly in moist shaded areas, often in or near rainforest. Flowers summer–autumn.



Fig. 12 COMMELINACEAE — A₁–A₂ *Commelina cyanea*, A₁ part of flowering stem x 1, A₂ spathe and flower showing petals and sepals x 1; B₁–B₂ *Murdannia graminea*, B₁ inflorescence x 1, B₂ flower x 3.

7. MURDANNIA Royle

Erect or procumbent herbs; stems weak. Inflorescences cymose or paniculate or with central axis and verticillate branches or flowers solitary or paired in axils; flowers \pm actinomorphic; perfect stamens 3, alternating with 3 staminodes, rarely staminodes fewer, filaments sometimes bearded. Fruits capsules.

50 species, tropical parts of the world; 4 species Australia; 1 species south-eastern Queensland.

1. *Murdannia graminea* (R. Br.) Brüchn.

GRASS LILY

Aneilema gramineum R. Br.

Stems erect, 10–60 cm tall; roots often \pm tuberous. Leaves grass-like, sheathing at base, mostly radical, up to 30 cm \times 0.8 cm, becoming smaller towards top of stem, \pm scabrous-hairy. Inflorescences terminal irregularly branched panicles; flowers pedicellate; petals blue or lavender, rarely white, *ca* 8 mm long; filaments all bearded. Capsules *ca* 8 mm long; seeds rugose-pitted. **Fig. 12B.**

Coastal and subcoastal areas, usually in sandy soil amongst grass in eucalypt open forest; common. Flowers summer–autumn. The plants tend to have lavender flowers on the coastal plain and blue flowers in more inland areas.

181. XYRIDACEAE

Perennial or rarely annual herbs; stems short. Leaves basal, closely crowded, linear or terete, sometimes twisted, sheathing at base. Inflorescences pedunculate, globose to cylindrical bracteate heads; flowers bisexual; calyx of 2 or 3 sepals, one forming hood over corolla; corolla with long or short slender tube and 3 lobes; stamens 3, usually alternate with 3 staminodes; ovary superior. Fruits capsules, enclosed in persistent corolla.

4 genera with *ca* 270 species, tropical America, except 1 genus which is worldwide; 1 genus with *ca* 19 species Australia; 1 genus with 3 species south-eastern Queensland.

1. XYRIS L.

Tufted herbs; roots fibrous. Leaves usually with enlarged open sheathing bases. Heads on rigid scapes; flowers solitary and sessile in axils of broad rigid coriaceous imbricate bracts; calyx zygomorphic, 2 outer sepals bract-like, persistent, inner sepal larger, membranous; corolla yellow or white, tube short, 3-lobed; staminodes conspicuous, usually hairy; style 3-lobed.

About 250 species, mostly tropical America, Asia, Africa and Australia; *ca* 19 species Australia; 3 species south-eastern Queensland.

All measurements of flower heads exclude corollas.

- | | | |
|--|-------------------------|---|
| 1. Scapes distinctly flattened; leaves flattened, linear, 1 mm or more wide | 1. <i>X. complanata</i> | 2 |
| Scapes terete or slightly angular; leaves \pm terete, up to 1 mm wide | | |
| 2. Flower heads 1–1.5 cm long; bracts \pm in 5 vertical rows; leaves 20–60 cm long | 2. <i>X. operculata</i> | |
| Flower heads 0.4–0.8 cm long; bracts not in vertical rows; leaves 2–12 cm long | 3. <i>X. juncea</i> | |

1. *Xyris complanata* R. Br.

Leaves flat, linear, 5–30 cm \times 0.1–0.4 cm, \pm striate, margin whitish, mostly minutely scabrous; sheathing bases pale to dark brown or reddish, 3–7 cm long. Scapes distinctly flattened, sometimes twisted, 20–65 cm \times 0.1–0.25 cm, with strong scabrous margin; flower heads up to 2.5 cm \times 0.7–1 cm wide when mature. Seeds *ca* 0.5 mm long.

Mainly in coastal and subcoastal areas but also known from around Stanthorpe in southern Darling Downs district, in damp places; common. Flowers spring to autumn, mainly summer.

Material of *Xyris complanata* var. *bracteata* Benth. reported to occur at "Moreton Bay" by F. M. Bailey, "Qd Fl." 5: 1684 (1902) has not been located and the variety is not included here.

2. *Xyris operculata* Labill.

Leaves rigid, \pm terete, striate, 20–60 cm \times 0.05–0.1 cm; sheathing bases shining brown, 5–15 cm long. Scapes terete, smooth, sometimes twisted, 30–100 cm \times 0.1–0.15 cm; flower heads 1–1.5 cm long, bracts numerous, \pm in vertical rows, becoming smaller towards base. Seeds *ca* 1.2 mm long.

Known in the region only from swampy areas on Stradbroke I. Flowers summer.

3. *Xyris juncea* R. Br.

Xyris gracilis auct. non R. Br., Benth.

Leaves subterete, smooth when fresh, often finely striate when dry, sometimes twisted, 1.5–12 cm \times *ca* 0.1 cm, sheathing bases pale brown to reddish, 0.4–2 cm long. Scapes filiform, terete or slightly angular, sometimes twisted, 7–30 cm \times up to 0.1 cm; heads 3–8 mm long. Seeds *ca* 0.5 mm long.

Damp or swampy sandy ground in coastal areas; moderately common. Flowers summer.

The small plants referred to *Xyris pauciflora* Willd. var. *albiflos* F. M. Bailey and *Xyris pusilla* R. Br. by F. M. Bailey, "Qd Fl." 5: 1649 (1902) are probably only plants of the above species flowering at an early stage.

182. ERIOCAULACEAE

Annuals or perennials, mostly monoecious, usually tufted herbs; roots fibrous. Leaves narrow, usually basal. Scapes slender, mostly longer than leaves; inflorescences densely crowded heads with involucre bracts at base; flowers inconspicuous, each flower subtended by bract, usually male and female flowers in same head; perianth usually of 4 or 6 segments in two series, outer different from inner; stamens 2–6; ovary superior. Fruits capsules; seeds few.

About 13 genera with *ca* 1100 species, mainly tropical and subtropical regions; 1 genus with *ca* 18 species Australia; 1 genus with 3 species south-eastern Queensland.

1. ERIOCAULON L.

Leaves basal, tufted, rarely crowded on stem, linear to narrowly ovate. Scapes erect, simple; perianth of 4 or 6 segments or one or both series variously reduced, when present there is a gland at apex of each segment; stamens 4 or 6, anthers often black; ovary 2- or 3-locular, ovules 1 per loculus.

About 400 species, mainly tropical and subtropical, mostly from the Americas; *ca* 20 species Australia; 3 species south-eastern Queensland.

- | | | | | | |
|---|---|---|---|------------------------|---|
| 1. Scapes 30 cm long or longer, leaves 15 cm or more long | . | . | . | 1. <i>E. australe</i> | |
| Scapes less than 30 cm long; leaves less than 15 cm long | . | . | . | . | 2 |
| 2. Flowering bracts with scattered white cylindrical papillae | . | . | . | 2. <i>E. scariosum</i> | |
| Flowering bracts without papillae | . | . | . | 3. <i>E. nanum</i> | |

1. *Eriocaulon australe* R. Br.

Annual. Leaves linear, grass-like, 15–60 cm \times 0.3–1.2 cm, \pm hairy. Scapes 30–100 cm tall, \pm hairy, ribbed when dry; heads semiglobose to depressed globose, up to *ca* 8 mm wide, involucre bracts \pm glabrous, flowering bracts with \pm dense white papillae giving heads whitish or greyish appearance. Seeds with papillae in longitudinal rows or glabrous.

Moreton and Wide Bay districts, in swampy places, mainly near the coast; common. Flowers mainly summer.

2. *Eriocaulon scariosum* Smith

Eriocaulon smithii R. Br.

Annual. Leaves glabrous or nearly so, linear to narrowly ovate, tapered to apex, 1.5–8 cm \times ca 0.15 cm at midpoint. Scapes 2–30 cm tall, \pm glabrous, ribbed when dry; heads \pm hairy, semiglobose to globose, ca 3–6 mm diameter, involucre bracts glabrous, flowering bracts with scattered white cylindrical papillae; outer perianth segments in male flowers 3, free, in female flowers 2 or 3, free, inner perianth segments 3. Seeds with papillae arranged in reticulate pattern.

Damp areas throughout the region; moderately common, but most common near the coast. Flowers mainly summer.

3. *Eriocaulon nanum* R. Br.

Annual. Leaves linear to narrowly ovate, up to ca 2 cm \times ca 0.15 cm. Scapes 1–2 cm tall, glabrous; heads semiglobose, ca 2 mm diameter, involucre bracts glabrous, flowering bracts glabrous, scarious; outer perianth segments in male flowers 3, fused, in female flowers 2 or 3, fused. Seeds not seen.

Collected twice in the region, once from the “Brisbane R.” and once from Mt Perry in the Burnett district.

183. RESTIONACEAE

Wiry, dioecious, occasionally monoecious perennials with creeping, tufted often woolly rhizomes. Leaves mostly reduced to sheathing scales (sheaths), imbricate at base, distichous, split on one side and overlapping. Flowers small, unisexual, rarely bisexual, each subtended by rigid glume, arranged in spikelets or spike-like panicles, male and female inflorescences similar or very dissimilar; perianth segments (tepals) 6 or fewer, scale-like, in 2 series; male flowers with stamens 3, opposite inner tepals, anthers dorsifixed, mostly 1-locular, rudimentary ovary present or absent; female flowers with ovary superior, 1–3-locular, ovules 1 per loculus, staminodes 0–3. Fruits nuts or capsules opening along angles.

30 genera with more than 250 species chiefly limited to southern Africa, Australia and New Zealand; ca 14 genera with ca 50 species Australia; 6 genera with 15 species south-eastern Queensland.

Key to plants with female inflorescences

- | | |
|--|-----------------------|
| 1. Ovaries 2- or 3-locular, style and style branches 2 or 3, fruits capsules | 2 |
| Ovaries 1-locular, style and style branches 1 or 3; fruits nuts, or rarely splitting down one side | 3 |
| 2. Flowers not in true spikelets, \pm loosely or paniculately arranged, lateral branches sometimes reduced to almost sessile clusters and panicle often spike-like; glumes loose, not closely imbricate, often shorter than tepals; bracteoles 1 or 2; ovary 3-locular | 1. <i>Lepyrodia</i> |
| Flowers arranged closely in true spikelets, or if spikelets are 1-flowered, then flower surrounded by imbricate barren glumes, glumes longer than tepals; bracteoles absent; ovary 2-locular | 2. <i>Restio</i> |
| 3. Plants monoecious; style 1, undivided | 3. <i>Coleocarya</i> |
| Plants dioecious; style branches 3 | 4 |
| 4. Female spikelets axillary, 1-flowered with several barren glumes; upper leaf sheath green, with spreading or reflexed subulate tip | 4. <i>Empodisma</i> |
| Female spikelets terminal, 1–several-flowered; leaf sheaths brown or dark brown with erect, appressed tips | 5 |
| 5. Female spikelets several-flowered; stems mostly unbranched except within inflorescence, straight, not apparently striate | 5. <i>Leptocarpus</i> |
| Female spikelets 1-flowered; stems mostly much branched, often flexuous, striate | 6. <i>Hypolaena</i> |

Key to plants with male inflorescences

- | | | |
|---|-----------------------|---|
| 1. Bracteoles present; flowers not in definite spikelets, \pm loosely and paniculately arranged, but branches sometimes reduced to \pm sessile clusters and panicle often becoming spike-like | 1. <i>Lepyrodia</i> | 2 |
| Bracteoles absent; flowers in true spikelets | | |
| 2. Plants monoecious; male spikelets terminal and solitary (female spikelets solitary in axils near base of culm) | 3. <i>Coleocarya</i> | 3 |
| Plants usually dioecious, or if monoecious then inflorescences not as above | | |
| 3. Male spikelets axillary; upper leaf sheaths green with spreading or reflexed subulate tip | 4. <i>Empodisma</i> | 4 |
| Male spikelets either terminal (solitary or in an inflorescence) or if axillary, then leaf sheaths not with spreading or reflexed tips | | |
| 4. Male inflorescences or individual spikelets erect or if drooping then spikelets 3–5 mm diameter; anthers exerted | 2. <i>Restio</i> | 5 |
| Male inflorescences or individual spikelets nodding or drooping; spikelets less than 3 mm diameter; anthers not exerted | | |
| 5. Culms mostly unbranched, straight, smooth, greyish with closely appressed, minute, scale-like trichomes; spikelets 3–4 mm \times ca 1 mm | 5. <i>Leptocarpus</i> | |
| Culms mostly branched, often flexuose, striate, hoary tomentose when young; spikelets up to 8 mm \times 2 mm | 6. <i>Hypolaena</i> | |

1. LEPYRODIA R. Br.

Herbs, dioecious or monoecious, with creeping or tufted scaly rhizomes; stems green, erect or scrambling, simple or branched. Leaves reduced to persistent sheaths with small linear or terete blades or absent. Inflorescences terminal, loosely paniculate or spike-like, male and female inflorescences similar; flowers not in definite spikelets; glumes loose, not closely imbricate; bracteoles 1 or 2 beneath each flower; tepals 6, glume-like or thin and almost hyaline, usually longer than glumes; male flowers with stamens 3, staminodes present; female flowers with ovary 3-angled, 3-locular, style branches 3, staminodes present.

About 20 species confined to Australia; 5 species south-eastern Queensland.

- | | | |
|--|--------------------------|---|
| 1. Flowers in distant clusters along rachis of inflorescence or few or solitary at apex of culm; cauline sheaths bearing small terete reflexed but deciduous laminas up to 3 mm long; stems commonly forming dense clump; found in coastal wallum heaths | 1. <i>L. interrupta</i> | 2 |
| Flowers in narrow or spike-like panicles; cauline sheaths not with reflexed laminas; stems erect not forming tangled mass; habitats various | | |
| 2. Sheaths none or 1 on aerial portion of stem | 2. <i>L. anarthria</i> | 3 |
| Sheaths 2 or more on aerial portion of stem | | |
| 3. Stems 0.5–0.75 mm wide, slender, wiry, somewhat flexuose, rugulose pitted; cauline sheaths 0.6–1 cm long | 3. <i>L. leptocaulis</i> | 4 |
| Stems (0.75–)1–4 mm wide, robust, straight, erect, smooth; cauline sheaths 1–3 cm long | | |
| 4. Sheaths not closely appressed, smooth | 4. <i>L. scariosa</i> | |
| Sheaths closely appressed, minutely pitted with transverse rows of stomata | 5. <i>L. caudata</i> | |

1. *Lepyrodia interrupta* F. Muell.

Dioecious; rhizomes shortly creeping, 3–8 mm diameter; stems often forming dense clumps, erect or flexuose, terete, simple or branched, 30–60 cm \times 0.05–0.1 cm, minutely pitted with transverse rows of stomata. Sheaths closely appressed, usually bearing small,

terete, usually reflexed blades. Inflorescences spikes; flowers in sessile clusters distant along rachis, or few or solitary at apex; individual flowers sessile or nearly so. **Fig. 13A.**

Moreton and Wide Bay districts in wet, coastal wallum; common. Flowers spring.

2. *Lepyrodia anarthria* F. Muell. ex Benth.

Dioecious; rhizomes shortly creeping or tufted, 2–8 mm diameter; stems unbranched, terete or slightly flattened, 30–70 cm \times 0.05–0.2 cm. Sheaths basal only or with single loose and reflexed or rarely appressed sheath on stem. Inflorescences terminal, erect, narrow panicles 1–5 cm long, subtending bracts on main axis erect, pale, membranous, often longer than subtended branch of inflorescence; bracteoles membranous. **Fig. 13C.**

Known from around Wyberba in southern Darling Downs district on wet peaty soils. Flowers summer.

3. *Lepyrodia leptocaulis* L. A. S. Johnson & O. D. Evans

Monococious; rhizomes shortly creeping, 2–4 mm diameter; stems erect, terete, wiry, simple or branched, 15–50 cm \times 0.05–0.075 cm, surface minutely wrinkled or pitted. Sheaths often appressed, loose when subtending branches. Inflorescences narrow terminal panicles of up to 30 flowers, subtending bracts loose, bracteoles membranous; male and female flowers often in the same inflorescence, males above, females nearer base. **Fig. 13B.**

Hillsides near Wyberba in southern Darling Downs district, in wet seepage areas. Flowers summer.

4. *Lepyrodia scariosa* R. Br.

Diocleia; rhizomes creeping, 2–5 mm diameter; stems erect, terete, unbranched, 30–100 cm \times 0.075–0.3(–0.4) cm. Sheaths 2–5, rarely 6 on stem, very loose, 1–4 cm long, often with short point. Inflorescences narrow panicles, 2–20(–25) cm long, with short erect branches; subtending bracts on main axis of inflorescence erect, pale or light brown, apex acute and attenuate; bracteoles 1 or 2, mostly shorter than tepals, hyaline. **Fig. 13E.**

Moreton and Wide Bay districts, near the coast in damp, sandy or peaty soils in woodlands and wallum heathland. Flowers summer.

5. *Lepyrodia caudata* L. A. S. Johnson & O. D. Evans

Diocleas; rhizomes creeping, 3–8 mm diameter; stems erect, terete, simple or branched, 75–200 cm \times 0.1–0.3 cm. Sheaths on stem brown, 1–3 cm long, closely appressed, brown, minutely pitted with transverse rows of stomata. Inflorescences short terminal panicles, 2–10 cm long, with flowers closely crowded on lateral branches, subtending bracts on main axis of inflorescence similar to upper sheaths; bracts on lateral branches subtending each flower membranous with filiform tip. **Fig. 13D.**

Moreton and Wide Bay districts, in wet, wallum swamps. Flowers spring-summer.

2. RESTIO L.

Diococious herbs; rhizomes creeping, often woolly, sometimes very short; stems erect, simple or branched. Sheaths persistent. Male and female inflorescences similar or dissimilar; spikelets 1-many-flowered, sessile or pedicellate, arranged in racemes or panicles or solitary; glumes imbricate; tepals 4-6, similar to glumes or often almost hyaline, not exceeding glumes; male flowers with stamens 3, usually shortly exserted, anthers 1-locular, rudimentary ovary small or absent; female flowers with staminodes 2 or 3 or absent, ovary 2- or 3-locular, style branches 2 or 3. Capsules flat, 2- or 3-angled, opening at margins.

120 species mainly occurring in southern Africa and Australia; *ca* 30 species Australia; 6 species southeastern Queensland.

- | | | |
|--|--------------------------|---|
| 1. Leaf blades present on some sheaths, up to 1.5 cm long, subulate; stems 15–45 cm × 0.05–0.08 cm | 1. <i>R. tenuiculmis</i> | 2 |
| Leaf blades absent; stems 30–150 cm × 0.1–0.5 cm | | |
| 2. Stems much branched | | 3 |
| Stems unbranched | | |



Fig. 13 RESTIONACEAE — A-E *Lepyrodia* spp. — A₁-A₂ *L. interrupta*, A₁ inflorescence with stem stomata x 2¼, A₂ enlargement of stem x 9; B *L. leptocaulis*, inflorescence and portion of stem x 2½; C *L. anarthria*, inflorescence x 2¼; D *L. caudata*, inflorescence and part of stem showing appressed sheath x 2¼; E *L. scariosa*, stem with open loose sheath x 2¼; F₁-F₂ *Leptocarpus tenax*, F₁ male inflorescence x 2¼, F₂ female inflorescence x 2¼.

- | | |
|---|---|
| 3. Stems bearing dense clusters of green sterile branches in axils of upper leaf sheaths
Stems with many lateral erect fertile branches | 2. <i>R. tetraphyllus</i>
subsp. <i>meiostachyus</i>
3. <i>R. fastigiatus</i> |
| 4. Stems distinctly flattened; rhizomes very short giving tufted appearance
Stems terete; rhizomes creeping and woolly | 4. <i>R. complanatus</i> 5 |
| 5. Non-overlapping portion of lowest subtending bract abruptly tapered to apex and not exceeding lowest spikelet; spikelets 10–60; mostly coastal wallum plants
Non-overlapping portion of lowest subtending bract tapered gradually to apex, sometimes longer than lowest spikelet; spikelets 4–10, rarely –13; plants of the mountainous area near Wyberba in the Darling Downs district | 5. <i>R. pallens</i>

6. <i>R. stenocoleus</i> |

1. *Restio tenuiculmis* S. T. Blake

Rhizomes shortly creeping, woolly; stems slender, erect, terete, unbranched or occasionally few-branched, 15–45 cm \times 0.05–0.08 cm. Some sheaths with short subulate blades up to 1.5 cm long. Inflorescences loose racemes of few spikelets or solitary terminal spikelet, subtending bracts of inflorescence similar to sheaths; male spikelets ovoid to subglobose, *ca* 4 mm long; female spikelets ellipsoid, 4–5 mm long; male flowers with 6 tepals; female flowers with 4 tepals, staminodes 2. **Fig. 14B.**

Moreton and Wide Bay districts, in wet sandy peaty soils of wallum heath. Flowers spring–summer.

2. *Restio tetraphyllus* Labill. subsp. *meiostachyus* L. A. S. Johnson & O. D. Evans

Rhizomes creeping, woolly; stems erect, terete, 50–150 cm \times 0.3–0.5 cm, bearing dense clusters of green, filiform, repeatedly branched, sterile branches in axils of upper leaf sheaths. Sheaths closely appressed; in juvenile shoots leaf blades up to 1.5 cm long may be developed. Inflorescences narrow loose terminal panicles *ca* 30 cm long, spikelets few–numerous on filiform peduncles; male spikelets ovoid to globular, 2.5–7 mm long; female spikelets ellipsoid to shortly cylindrical, 4–10 mm long; male flowers with 6 tepals; female flowers with 4 tepals, staminodes 2. **Fig. 14D.**

Moreton and Wide Bay districts, in damp areas of wallum heaths and *Melaleuca* swamps; common. Flowers summer.

3. *Restio fastigiatus* R. Br.

Rhizomes creeping, woolly; stems erect, terete, divided into numerous erect straight flowering branches, 30–100 cm \times 0.1–0.2 cm. Sheaths dark brown, closely appressed. Inflorescences panicles of numerous narrow spikelets, solitary in axils of subtending bracts; bracts sometimes nearly as long as spikelets; male spikelets several-flowered, ellipsoid-cylindrical, 4–6 mm long; female spikelets similar but 1-flowered, 4–6 mm long; male and female flowers with 6 tepals, female with 3 staminodes. **Fig. 14A.**

Known from near Woodgate in the Wide Bay district, in wallum heath.

4. *Restio complanatus* R. Br.

Rhizomes very short, densely tufted; stems erect, distinctly flattened, unbranched, 30–100 cm \times 0.1–0.5 cm, finely striate. Sheaths closely appressed, thin, obtuse. Inflorescences narrow panicles of 10–20 spikelets, bracts shorter than spikelets; male spikelets many-flowered, narrowly ovoid, 5–6 mm long; female spikelets fewer flowered than males, oblong-ovoid, up to 10 mm long; male flowers with 4 tepals; female flowers with 4 tepals, staminodes 2. **Fig. 14E.**

Moreton and Wide Bay districts, in damp, sandy peaty soil in coastal wallum. Flowers spring.

5. *Restio pallens* R. Br.

Rhizomes creeping, woolly; stems erect, terete, unbranched, 50–100 cm \times 0.2–0.4 cm. Sheaths appressed, glabrous, obtuse. Inflorescences usually narrow 2-branched panicles up to 25 cm long with 10–60 very shortly pedicellate or sessile spikelets, non-overlapping part of lowest subtending bract abruptly tapered to apex, mostly shorter than sheathing base, never lax and seldom exceeding lowest spikelets; male and female spikelets similar,

ellipsoid to subglobose, 4–6 mm long; male flowers with 6 tepals; female flowers with 4 tepals, staminodes 2. **Fig. 14C.**

Moreton and Wide Bay districts, in damp areas on sandy peaty soils in wallum swamp and heath; common. Flowers early summer.

6. *Restio stenocoleus* L. A. S. Johnson & O. D. Evans

Rhizomes creeping, woolly; stems erect, terete, unbranched, 50–150 cm \times 0.1–0.2 cm. Sheaths closely appressed, margin glabrous or ciliate. Inflorescences narrow panicles or racemes 2–5 cm long, with 4–10 spikelets on filiform pedicels up to 1 cm long, lowest subtending bract of inflorescence erect, 1–2 cm \times 0.15–0.3(–0.4) cm, tapered gradually to apex, sometimes longer than lowest spikelet; male spikelets globose, 5–7 mm long; female spikelets ovoid to ellipsoid, 5–8 mm long; male flowers with 6 tepals; female flowers with 4 tepals, staminodes 2. **Fig. 14F.**

Vicinity of Wyberba in southern Darling Downs district in swampy areas. Flowers summer.

3. COLEOCARYA S. T. Blake

Perennial monoecious herbs with creeping rhizomes. Male and female inflorescences on same stem; male spikelets terminal, solitary, several-flowered; female spikelets axillary, solitary, 1-flowered, enclosed in axils of sheathing floral bracts near base of stem; male flowers with 6 tepals, stamens 3; female flowers with 6 tepals, ovary 1-locular, style undivided. Fruits hard, bony, indehiscent.

1 species endemic in Australia, occurring in south-eastern Queensland.

1. *Coleocarya gracilis* S. T. Blake

Rhizomes creeping, 3–4 mm diameter, woolly hairy; stems green, simple or branched, erect, terete, 15–30 cm \times 0.1 cm. Sheaths lax, erect, truncate with small subulate or terete blades. Male spikelets ovoid to narrowly ovoid, 8–10 mm long, 8–10-flowered, glumes 3.5–5 mm long, male flowers with 6 tepals, outer 3 narrowly obovate, 3.5–4 mm long, 3 inner almost linear; female spikelets each almost wholly enclosed in floral bract at node in lower portion of stem, female flowers with 6 tepals, outer 3 narrowly obovate, obtuse, inner 3 much narrower, nearly linear. Nuts dark brown, obloid, 3.5–4.5 mm \times 1.5 mm. **Fig. 15B.**

Moreton and Wide Bay districts, in sandy soils in drier wallum heath areas; common. Flowers summer.

4. EMPODISMA L. A. S. Johnson & Cutler

Perennials, dioecious, rarely monoecious, with shortly creeping or tufted rhizomes; stems green, thin and wiry, branched. Sheaths persistent with or without rudimentary blades. Male and female inflorescences similar; male spikelets several together, rarely solitary, 1–several-flowered; female spikelets solitary, 1-flowered; male flowers with 6 tepals, glume-like or membranous, stamens 3, anthers 1-locular; female flowers with 6 or 4 tepals, staminodes 3 or none, ovary 1-locular, style branches 2 or 3. Fruits small ovoid or obovoid nuts.

2 species, Australia and New Zealand; 2 species Australia; 1 species south-eastern Queensland.

1. *Empodisma minus* (J. D. Hook.) L. A. S. Johnson & Cutler

Calorophus minor J. D. Hook.

Rhizomes up to 3 mm diameter; stems erect becoming procumbent, terete, much branched and usually flexuose, 20–200 cm \times ca 0.1 cm. Sheaths and floral bracts greenish, 3–10 mm long, closely appressed with woolly hairs near apex; blades reflexed, subulate, 1–4 mm long. Male spikelets axillary, pedicellate, 4–8 mm long, male flowers with 6 tepals; female spikelets in upper axils, sessile, glumes 1–3, female flowers with 4–6 tepals, membranous, styles 3 or 2. Nuts ovoid-globular. **Fig. 15A.**

Moreton and Wide Bay districts, in coastal wallum areas; common. Flowers spring–summer.



Fig. 14 RESTIONACEAE — A–F *Restio* spp. — A *R. fastigiatus*, inflorescence $\times 2\frac{1}{4}$; B *R. tenuiculmis*, inflorescence and part of stem $\times 2\frac{1}{4}$; C *R. pallens*, inflorescence $\times 2\frac{1}{4}$; D *R. tetraphyllus* subsp. *meiostachyus*, inflorescence and part of stem $\times \frac{3}{4}$; E *R. complanatus*, inflorescence and part of stem showing margin of sheath $\times 2\frac{1}{4}$; F *R. stenocoleus*, inflorescence and portion of stem $\times 2\frac{1}{4}$.



Fig. 15 RESTIONACEAE — A *Empodisma minus*, inflorescence and part of stem showing hairs at sheath x $2\frac{1}{4}$; B *Coleocarya gracilis*, inflorescence and part of stem showing sheath x $2\frac{1}{4}$; C *Hypolaena fastigiata*, inflorescence x $2\frac{1}{4}$.

5. LEPTOCARPUS R. Br.

Perennials, dioecious, with creeping or tufted rhizomes; stems simple or branched. Sheaths appressed, sometimes with rudimentary blades. Male and female inflorescences similar or very dissimilar; spikelets in both sexes with several flowers, rarely 1-flowered in females, glumes imbricate; bracteoles mostly absent; tepals 6, unequal; male flowers with 3, rarely 2 stamens, anthers oblong, 1-locular; female flowers with 3 or 0 staminodes, ovary 1-locular, ovule 1; style branches 3, rarely 2. Fruits nuts.

About 15 species, mainly Australia, but also south-eastern Asia, New Zealand and Chile; 12 species endemic in Australia; 1 species south-eastern Queensland.

1. *Leptocarpus tenax* (Labill.) R. Br.

Schoenodum tenax Labill.

Rhizomes glabrous, 4–7 mm diameter; stems erect, straight, mostly unbranched, greyish green due to covering of closely appressed scale-like trichomes, 60–100 cm × 0.1–0.2 cm. Sheaths brown, closely appressed, striate, up to 8 mm long. Male spikelets often numerous, pedicellate, several-flowered, *ca* 4 mm long, forming drooping terminal panicle 5–10 cm long, glumes dark brown, *ca* 2 mm long, imbricate; female spikelets several-flowered, 0.5–1.5 cm long, either solitary, sessile and terminal, or several, shortly pedicellate in terminal racemes or narrow panicles, glumes dark brown, 6–9 mm long. Nuts 1–2 mm long. **Fig. 13F.**

Moreton and Wide Bay districts, in sandy peaty soil near margin of coastal swamps; common. Flowers summer.

6. HYPOLAENA R. Br.

Perennials, dioecious, rhizomes creeping; stems wiry, branched, often flexuous, leafless except for sheaths which may bear rudimentary blades. Male and female inflorescences dissimilar; male spikelets in panicles, pedicellate, several-flowered, male flowers with 6 tepals, stamens 3, anthers 1-locular, filaments very short; female spikelets 1-flowered, terminal, sessile, solitary or 2 or 3 together, glumes much longer than those of males, female flowers with 6 tepals, short, broad, membranous, shorter than ovary, ovary 1-locular, ovule 1, style branches 3. Fruits nuts.

2 species, endemic in Australia; 1 species south-eastern Queensland.

1. *Hypolaena fastigiata* R. Br.

Rhizomes shortly creeping, 3–5 mm diameter, woolly hairy; stems erect or ascending, flexuose, 20–50 cm × 0.1–0.2 cm, striate, covered by dense white tomentum when young but nearly glabrous at maturity. Sheaths dark brown, closely appressed, acute, up to 2 cm long. Flowers in terminal spikelets; male spikelets cylindrical to narrowly obovoid, 3–8 cm × *ca* 0.2 cm, on filiform pedicels, few–many together forming ± nodding panicles; female spikelets sessile, erect, solitary or 2 or 3 together at end of branchlets, 0.6–1.2 cm long. Nuts ovoid, *ca* 3 mm × *ca* 2 mm. **Fig. 15C.**

Moreton and Wide Bay districts, in damp sandy heath near margins of swamps. Flowers summer.

184. CENTROLEPIDACEAE

Small, tufted, annual or perennial herbs. Leaves basal, crowded, sheathing at base. Inflorescences spikes or heads, usually scapose, usually subtended by 1–3 glume-like bracts, consisting of male and female florets; perianth absent; male florets consisting of solitary stamen, female florets consisting of solitary carpel, male and female florets often united into units resembling bisexual flowers. Fruits dry, dehiscent.

6 genera with 40 species, south-eastern Asia to Australia and the Antarctic; 6 genera with *ca* 31 species Australia; 1 genus with 2 species south-eastern Queensland.

1. CENTROLEPIS Labill.

Annual or perennials. Leaves linear-filiform. Scapes erect, leafless; inflorescences heads of 1 or more units of 2-many female florets and usually 1 male floret, heads with 2 subtending bracts; individual carpels in units superposed in 2 rows on 1 side of linear receptacle-like structure.

About 24 species from south-eastern Asia to Australia and New Zealand; 19 species Australia; 2 species south-eastern Queensland.

- | | |
|--|---------------------------|
| 1. Subtending bracts each with awn as long as or longer than broad basal section | 1. <i>C. fascicularis</i> |
| Subtending bracts each with awn less than half length of broad basal section or awn absent | 2. <i>C. strigosa</i> |

1. *Centrolepis fascicularis* Labill.

Perennial herb forming dense cushion. Leaves acute, 1-3 cm \times ca 0.08 cm, glabrous in upper part, usually with few hairs in lower part. Scapes up to 6 cm long, glabrous, subtending bracts 3-6 mm long including awn, awns as long as or longer than basal part, basal part stiffly hairy.

Known from the vicinity of Stanthorpe in the Darling Downs district; rare in the region. Flowers summer.

2. *Centrolepis strigosa* (R. Br.) Roemer & Schultes

Devauxia strigosa R. Br.

Annual herb. Leaves mucronate, 1-2.5 cm \times ca 0.08 cm, pilose. Scapes up to 10 cm long, glabrous or hairy, subtending bracts 3-4 mm long, without awns or awns less than half length of basal portion, basal part stiffly hairy.

Known from a few places in the Darling Downs and Wide Bay districts but possibly to be found elsewhere in the region. Flowers summer.

185. FLAGELLARIACEAE

Stems erect or climbing. Leaves with sheathing bases; blades often ending in a tendril. Inflorescences terminal panicles; flowers bisexual or unisexual; perianth segments 6, free, 2-seriate, dry or somewhat petaloid; stamens 6; ovary superior, style 3-lobed. Fruits indehiscent, fleshy or drupaceous.

2 or 3 genera with ca 8 species, tropics and subtropics; 1 genus with 1 species Australia, occurring in south-eastern Queensland.

1. FLAGELLARIA L.

Robust, glabrous, herbaceous climbers. Leaves narrowly ovate, apex produced into spirally twisted tendril by which plant climbs, nerves many, parallel. Flowers small, bisexual; inner perianth segments larger than outer segments.

About 4 species, tropics and subtropics from Africa to the Pacific region; 1 species Australia, occurring in south-eastern Queensland.

1. *Flagellaria indica* L.**FLAGELLARIA**

Flagellaria indica var. *gracilicaulis* F. M. Bailey

Perennial, climbing up trees to a height of ca 15 m or sometimes spreading; stems up to 2 cm diameter. Leaf sheaths closed, up to 15 cm long; blades contracted above sheaths, 7-50 cm \times 1-2 cm. Panicles erect, much branched, up to 20 cm \times ca 25 cm; flowers numerous; perianth segments white, ca 2-2.5 mm long. Fruits red, 4-6 mm diameter.

Moreton and Wide Bay districts, in or near rainforest, along streams and behind the mangrove zone on seashores and estuaries; moderately common. Flowers spring to autumn. Young shoots suspected on field observations of poisoning cattle.

186. POACEAE
(GRAMINEAE)

Annual or perennial herbs, sometimes with rhizomes or stolons; culms tufted or single-stemmed, geniculate ascending to erect, cylindrical, rarely flattened. Leaves arising from nodes, alternate and two-ranked, very rarely spirally arranged, consisting of sheath, ligule and blade; sheaths encircling culm, margins free and overlapping or \pm connate, sometimes apical shoulders extending into auricles; ligules situated internally between sheaths and blades, membranous, hairy or absent; blades usually long and narrow, flattened, rolled or terete, parallel-nerved. Inflorescences spikelets in panicles, or in spikes or racemes, these either solitary or digitate; spikelets consisting of bracts arranged along an axis (rachilla), 2 lower bracts (glumes) empty, succeeding bracts arranged in pairs (lemma and palea) which enclose a flower, the whole termed a floret; spikelet may consist of one-many florets, spikelet base may extend into a callus and spikelet may or may not have awns; flowers bisexual or unisexual. Fruits caryopses with thin pericarp adnate to seed. **Fig. 16.**

About 620 genera with *ca* 10,000 species, worldwide; *ca* 209 genera with *ca* 1,200 species Australia; 121 genera with 419 species south-eastern Queensland.

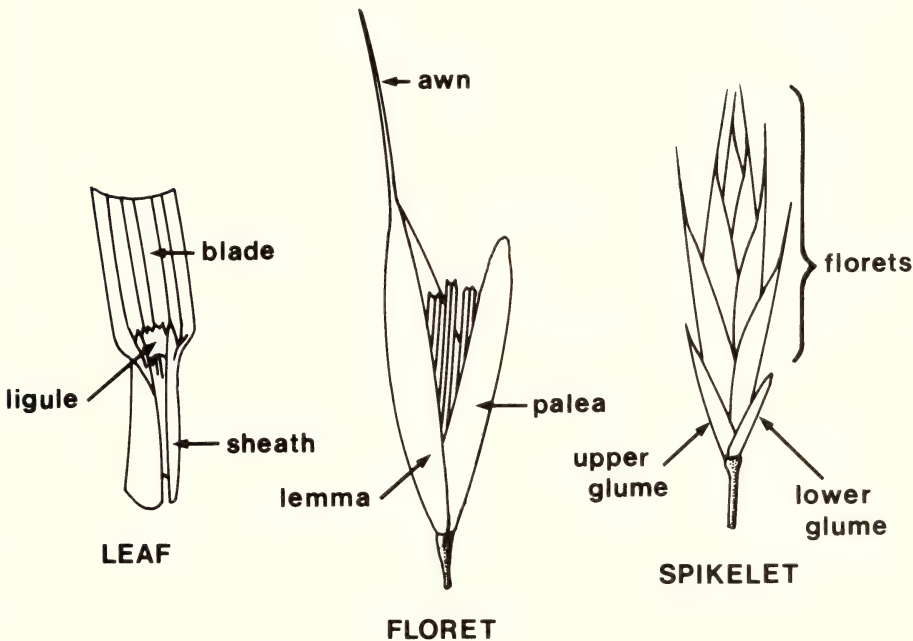


Fig. 16 POACEAE — Schematic diagram showing parts of leaf, floret and spikelet.

- | | | |
|--|---------------------|----|
| 1. Leaves spirally arranged, less than 2 cm long | 45. <i>Micraira</i> | 2 |
| Leaves \pm 2-ranked, usually more than 2 cm long | | |
| 2. Inflorescences groups of 1-4 spikelets completely enclosed within upper leaf sheaths, or inflorescences racemes, sometimes reduced, subtended by leafy spathes, these grouped into leafy false panicles | | 3 |
| Inflorescences not as above, sometimes spikelets in racemes which may be partly enclosed by leafy spathes but these do not form leafy panicles | | 10 |

3. Inflorescences groups of 1-4 spikelets completely enclosed within upper leaf sheaths		4
Inflorescences groups of racemes subtended by leafy spathes, these grouped into leafy false panicles		6
4. Plants with numerous rhizomes and numerous stolons rooting at nodes; plants without a second type of inflorescence on same plant	91. <i>Pennisetum</i>	
Plants without rhizomes and stolons; plants with racemes or panicles as well as axillary spikelets		5
5. Upper glume of axillary spikelets 3-7 mm long	84. <i>Cleistochloa</i>	
Upper glume of axillary spikelets 0.5-1.5 mm long	88. <i>Calyptrichloa</i>	
6. Racemes consisting of outer spikelets forming an involucre around a group of inner spikelets		7
Racemes consisting of pairs of spikelets, 1 sessile and 1 pedicellate, though pedicellate spikelet may be reduced to pedicel		8
7. Racemes consisting of 4 pedicellate outer spikelets forming an involucre around 3 sessile spikelets and 2 pedicellate spikelets	120. <i>Iseilema</i>	
Racemes consisting of 4 sessile outer spikelets forming an involucre around 1 or more pairs of spikelets, each pair consisting of a sessile and a pedicellate spikelet	119. <i>Themeda</i>	
8. Pedicellate spikelets reduced to pedicels	115. <i>Andropogon</i>	
Pedicellate spikelets present		9
9. Lower glume of sessile spikelet prominently 2-keeled, one keel near each margin	116. <i>Cymbopogon</i>	
Lower glume of sessile spikelet rounded or keeled only towards tip	117. <i>Hyparrhenia</i>	
10. Inflorescences of spikelets arranged in simple spikes or racemes (care should be taken to ensure that what appears to be a spike is not a panicle with contracted branches)		11
Inflorescences with spikelets arranged in panicles or panicles of spikes or panicles of racemes or subdigitate or digitate arrangements of spikes or racemes		48
11. Lemmas very deeply lobed, awn arising in sinus of lobes and as long as or shorter than lobes	40. <i>Monachather</i>	
Lemmas not lobed, or if lobed and awns arising in sinuses then awns much longer than lobes		12
12. Awns present on 1 or more glumes and/or lemmas (note: awns may be as short as 0.5 mm)		13
Awns absent from glumes and lemmas		33
13. Spikelets 3 per node of inflorescence		14
Spikelets 1 or 2 per node of inflorescence		15
14. Florets 1 per spikelet; lemmas 1 per spikelet	36. <i>Critiesion</i>	
Florets 3 or more per spikelet; lemmas 3 or more per spikelet	33. <i>Elymus</i>	
15. Spikelets 2 per node of inflorescence, usually 1 spikelet sessile and 1 pedicellate		16
Spikelets 1 per node of inflorescence		21
16. Florets 3-9 per spikelet	33. <i>Elymus</i>	
Florets 2 per spikelet, sometimes 1 or both florets much reduced		17
17. Sessile spikelet with lower floret not reduced to lemma		18
Sessile spikelets with lower floret reduced to lemma		19
18. Sessile spikelets with awns up to 2 cm long	101. <i>Ischaemum</i>	
Sessile spikelets with awns 3.5-4.5 cm long	102. <i>Sehima</i>	
19. Sessile spikelets with upper glumes much shorter than lower glumes	104. <i>Elionurus</i>	
Sessile spikelets with upper and lower glumes \pm equal in length		20

20. Awns 5 cm or more long	118. <i>Heteropogon</i>	
Awns up to 3 cm long	114. <i>Schizachyrium</i>	
21. Florets 1 per spikelet, 1 lemma only present, rarely few spikelets with 2 florets		22
Florets 2 per spikelet, sometimes some florets reduced to lemmas, if so then number of lemmas indicates the number of florets		24
22. Spikelets sunken in cavities of articulated rachis	64. <i>Lepturus</i>	
Spikelets not sunken in cavities of articulated rachis		23
23. Awns up to 0.4 cm long; lower glumes absent; creeping perennials of sandy coastal areas	66. <i>Zoysia</i>	
Awns 0.6–4 cm long; lower glumes present; \pm erect annuals of sandy or stony areas through the region	65. <i>Perotis</i>	
24. Lower glumes up to 1 mm long or absent or terminal spikelets only with lower glume more than 1 mm long		25
Lower glumes more than 1 mm long on all spikelets		27
25. Terminal spikelets with well developed glumes; glumes absent from other spikelets; florets 3–20 per spikelet, all usually fertile	14. <i>Lolium</i>	
All spikelets with glumes up to 1 mm long or sometimes lower glumes absent; florets 2 or 3 per spikelet, only upper one fertile		26
26. Upper glumes \pm as long as spikelet	88. <i>Calypochloa</i>	
Upper glumes much shorter than spikelet	3. <i>Microlaena</i>	
27. Upper glumes more than 5 mm long		28
Upper glumes up to 5 mm long		31
28. Lemmas 3-lobed, 3-nerved	53. <i>Astrebla</i>	
Lemmas not 3-lobed, 5–9-nerved		29
29. Spikelets \pm distinctly pedicellate	34. <i>Australopyrum</i>	
Spikelets sessile or with rudimentary pedicels		30
30. Ligules 1–2 cm long; plants annual	35. <i>Triticum</i>	
Ligules ca 0.5 mm long; plants perennial	33. <i>Elymus</i>	
31. Glumes 4–5 mm long	33. <i>Elymus</i>	
Glumes 1.5–3.5 mm long		32
32. Awns 4–5 mm or more long	51. <i>Enteropogon</i>	
Awns up to 1 mm long	60. <i>Tripogon</i>	
33. Male spikelets in upper part of inflorescence, spreading; female spikelets in lower part of inflorescence overlapping and appressed to rachis	121. <i>Chionachne</i>	
Spikelets not arranged as above		34
34. Spikelets in pairs, 1 sessile and 1 pedicellate, pedicellate spikelets often reduced		35
Spikelets solitary		38
35. Lower glumes of sessile spikelets with fringe of stiff curved spines	103. <i>Eremochloa</i>	
Lower glumes of sessile spikelets without fringe of stiff curved spines		36
36. Lower glumes of sessile spikelets with fringe of straight hairs	104. <i>Elionurus</i>	
Lower glumes of sessile spikelets without fringe of hairs		37
37. Sessile and pedicellate spikelets similar, glumes similar; pedicels of pedicellate spikelets not fused to rachis	105. <i>Hemarthria</i>	
Sessile and pedicellate spikelets dissimilar, lower glumes of pedicellate spikelets with prominent nerves, lower glumes of sessile spikelets without prominent nerves; pedicels of pedicellate spikelets fused to rachis	106. <i>Rottboellia</i>	

38. Spikelets with 1 or 2 florets, if 2 then sometimes lower floret reduced; lemmas 1 or 2		39
Spikelets with 3-many florets, sometimes 2 or more reduced; lemmas 3 or more		44
39. Inflorescences 1-sided racemes fused to spathe-like structures	96. <i>Thuarea</i>	
Inflorescences not as above		40
40. Spikelets sunken in cavities of articulated rachis	64. <i>Lepturus</i>	
Spikelets not sunken in cavities		41
41. Lower glumes more than 1 mm long, with thick bristles on back	95. <i>Thyridolepis</i>	
Lower glumes less than 1 mm long except sometimes on terminal spikelet or glumes absent, if present then without bristles on back		42
42. Upper glumes 0.5-1.5 mm long	88. <i>Calypochloa</i>	
Upper glumes <i>ca</i> 3-4 mm long		43
43. Plants with creeping rhizomes and stolons, found on coastal sands especially sand dunes	66. <i>Zoysia</i>	
Plants tufted, widespread but often in sandstone areas	84. <i>Cleistochloa</i>	
44. Lower glumes absent on all but terminal spikelet	14. <i>Lolium</i>	
Lower glumes present on all spikelets		45
45. Spikelets with 3 florets, lower 2 florets reduced to lemmas	2. <i>Tetrarrhena</i>	
Spikelets with 3 or more florets, more than 1 floret fertile		46
46. Glumes spreading horizontally, 3-9-nerved	10. <i>Briza</i>	
Glumes not spreading horizontally, 1-nerved, or 5-7-nerved		47
47. Glumes 1-nerved	60. <i>Tripogon</i>	
Glumes 5-7-nerved	35. <i>Triticum</i>	
48. Inflorescences digitate or subdigitate arrangements of spikes or spike-like racemes terminal on culms		49
Inflorescences panicles		68
49. Awns absent from glumes and lemmas		50
Awns present on 1 or more glumes and/or lemmas (note: awns may be as short as 0.5 mm)		57
50. Lower glumes minute or absent		51
Lower glumes present		52
51. Lower lemma abaxial	82. <i>Axonopus</i>	
Lower lemma adaxial	81. <i>Paspalum</i>	
52. Florets 3-11 per spikelet		53
Florets 1 or 2 per spikelet		54
53. Upper glumes 1.5-2 mm long	57. <i>Leptochloa</i>	
Upper glumes 2.5-4.5 mm long	58. <i>Eleusine</i>	
54. Inflorescences clusters of racemes, each raceme subtended by large bracts; plants always of seashores	97. <i>Spinifex</i>	
Inflorescences not subtended by bracts; plants usually not of seashores		55
55. Spikelets 2 or more together or if 1 then lower glume much smaller than upper, sometimes lower glume reduced to scale	90. <i>Digitaria</i>	
Spikelets always solitary but arranged in 2 rows along 1 side of rachis; glumes subequal		56
56. Glumes shorter than lemmas	47. <i>Cynodon</i>	
Glumes longer than lemmas	49. <i>Brachyachne</i>	

[illegible]

77. Spikelets \pm embedded in concavities on 1 side of elongated central axis	77. <i>Stenotaphrum</i>	78
Spikelets not embedded in central axis		
78. Spikelets hidden by long silky hairs arising on glumes	99. <i>Imperata</i>	79
Spikelets without silky hairs		
79. Upper glumes with 5 prominent ribs each with a row of stout prickles	67. <i>Tragus</i>	80
Upper glumes not prominently ribbed nor with stout prickles		
80. Upper glumes gibbous towards base, often also with tubercular-based hairs	72. <i>Sacciolepis</i>	81
Upper glumes not gibbous, never with tubercular-based hairs		
81. Florets 1 per spikelet		82
Florets 2-4 per spikelet		83
82. Glumes 1-nerved	63. <i>Sporobolus</i>	
Glumes 3-5-nerved	29. <i>Phleum</i>	
83. Glumes enclosing florets; inflorescences mostly less than 20 cm long	32. <i>Phalaris</i>	
Glumes not enclosing florets, shorter than spikelet; inflorescences more than 20 cm long	61. <i>Thellungia</i>	
84. Spikelets pendulous		85
Spikelets not pendulous		86
85. Glumes spreading from rachis of spikelet	10. <i>Briza</i>	
Glumes not spreading	16. <i>Avena</i>	
86. Glumes equal or subequal in length		87
Glumes unequal in length or one or both absent		97
87. Spikelets in pairs, one sessile and one pedicellate	107. <i>Sorghum</i>	88
Spikelets not in pairs		
88. Axes of spikelets with long silky hairs	38. <i>Phragmites</i>	89
Axes of spikelets without hairs		
89. Spikelets with 1 lemma		90
Spikelets with more than 1 lemma		91
90. Lemmas hyaline, thinner than glumes	25. <i>Agrostis</i>	
Lemmas chartaceous, not thinner than glumes	24. <i>Deyeuxia</i>	
91. Lemmas 2 per spikelet		92
Lemmas more than 2 per spikelet		94
92. Lemmas longer than glumes	44. <i>Eriachne</i>	
Lemmas as long as or shorter than glumes		93
93. Upper glumes minutely hairy	89. <i>Homopholis</i>	
Upper glumes glabrous	98. <i>Isachne</i>	
94. Spikelets with 3 florets, only 1 fully developed	4. <i>Ehrharta</i>	95
Spikelets obviously with 3 or more florets, 3 or more fully developed		
95. Lemmas 3-lobed or 3-toothed	62. <i>Triodia</i>	96
Lemmas not 3-lobed nor 3-toothed		
96. Glumes 3-9-nerved, longer than lemmas; lemmas with wide scarious margins	10. <i>Briza</i>	
Glumes 1-nerved, usually shorter than lemmas; lemmas membranous	57. <i>Leptochloa</i>	

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| 97. Spikelets with glumes absent, only lemma and palea present | 1. <i>Leersia</i> | 98 |
| Spikelets with at least 1 glume present | | |
| 98. Spikelets with 2-several florets, all similar | | 99 |
| Spikelets with 1-2 florets, if 2 then lower floret dissimilar to upper
floret and usually reduced to lemma | | 104 |
| 99. Lemmas 3-nerved | | 100 |
| Lemmas 5-11-nerved | | 101 |
| 100. Inflorescences consisting of several slender racemes scattered along a
central axis; lemmas obtuse, entire or emarginate, sometimes
mucronate | 57. <i>Leptochloa</i> | |
| Inflorescences not as above; lemmas acute or acuminate | 55. <i>Eragrostis</i> | |
| 101. Lemmas 8 mm or more long, 11-nerved | 15. <i>Bromus</i> | 102 |
| Lemmas less than 7 mm long, 5- or 7-nerved | | |
| 102. Lemmas 7-nerved, rounded on back | 6. <i>Glyceria</i> | 103 |
| Lemmas 5-nerved, keeled or rounded on back | | |
| 103. Lower lemmas ciliate on margin | 22. <i>Hierochloa</i> | |
| Lemmas not ciliate on margin | 7. <i>Poa</i> | |
| 104. Upper glumes 0-1-nerved | | 105 |
| Upper glumes 2-11-nerved | | 107 |
| 105. Florets 2, lower floret reduced to lemma | 90. <i>Digitaria</i> | 106 |
| Florets 1 | | |
| 106. Lower glumes slightly longer than upper glumes | 25. <i>Agrostis</i> | |
| Lower glumes shorter than upper glumes | 65. <i>Sporobolus</i> | |
| 107. Lower glumes minute or absent; often the spikelet has the appearance
of having a solitary floret as the lower lemma and upper glumes
may be mistaken for upper and lower glumes | | 108 |
| Lower glumes not minute or absent, spikelets always with 2 glumes and
2 lemmas | | 110 |
| 108. Lower glumes minute, reduced to cupular scales clasping bead-like
swellings | 85. <i>Eriochloa</i> | 109 |
| Lower glumes absent or if minute then not clasping bead-like swellings | | |
| 109. Upper lemma stiffened, inrolled and embracing palea | 81. <i>Paspalum</i> | |
| Upper lemma not as above | 84. <i>Cleistochloa</i> | |
| 110. Upper lemma densely silky pubescent | 83. <i>Entolasia</i> | 111 |
| Upper lemma not densely silky pubescent | | |
| 111. Rachises of racemes of inflorescences each terminating in a bristle | 75. <i>Paspalidium</i> | 112 |
| Rachises of racemes of inflorescences not each terminating in a bristle | | |
| 112. Upper glumes and lower lemmas of spikelets with hooked hairs | 71. <i>Ancistrachne</i> | 113 |
| Upper glumes and lower lemmas of spikelets without hooked hairs | | |
| 113. Upper glumes up to $\frac{2}{3}$ length of spikelets | | 114 |
| Upper glumes from $\frac{3}{4}$ length of, to as long as spikelets | | 115 |
| 114. Lower glumes 1 mm or more long; upper glumes glabrous | 86. <i>Ottochloa</i> | |
| Lower glumes less than 1 mm long or absent or if 1 mm or more long
then upper glumes pubescent | 90. <i>Digitaria</i> | |
| 115. Spikelets with pedicels unequal in length | 70. <i>Panicum</i> | 116 |
| Spikelets with pedicels equal in length | | |
| 116. Lower glume and lower lemma abaxial | 80. <i>Brachiaria</i> | |
| Lower glume and lower lemma adaxial | 74. <i>Echinochloa</i> | |

117. Panicles of densely packed fascicles of branches, each fascicle consisting of 3-6 branches	12. <i>Lamarckia</i>	118
Panicles not of densely packed fascicles of branches		
118. Lemmas each with 9 plumose awns	68. <i>Enneapogon</i>	119
Lemmas each or some with up to 3 awns or no lemmas with awns		
119. Branches of panicles produced beyond last spikelet into bristle up to 2.5 cm long (the bristle appears to arise at base of uppermost spikelet)	79. <i>Pseudoraphis</i>	120
Branches of panicles not produced beyond last spikelet into bristle		
120. Awned lemmas with 3 awns or awns 3-fid		121
Awned lemmas with 1 awn, awns not branched or lemmas without awns		124
121. Awned lemmas with 3 \pm equal lobes, each lobe produced into awn; palea with 2 lobes, each lobe produced into awn	41. <i>Amphipogon</i>	122
Awned lemmas not with 3 \pm equal lobes; paleas not lobed		
122. Glumes with densely plumose awns	27. <i>Lagurus</i>	123
Glumes not awned		
123. Awns all arising at tip of lemma or awn 3-fid	46. <i>Aristida</i>	
Lateral awns arising on side of lemma, terminal awn arising in sinus of bifid lemma tip	43. <i>Triraphis</i>	
124. One or both glumes awned; one or more lemmas usually but not always awned		125
Glumes not awned; one or more lemmas always awned		138
125. No lemmas with awns		126
At least 1 lemma per spikelet with awn		128
126. Spikelets solitary; inflorescences a series of spikes arranged along a central axis, the spikes becoming reflexed at maturity	54. <i>Dinebra</i>	127
Spikelets in pairs; inflorescences not as above		
127. Trailing plants with decumbent stems rooting at the nodes; leaves 0.4-1.8 cm wide	78. <i>Oplismenus</i>	
Erect or ascending plants, stems not rooting at nodes; leaves up to 0.4 cm wide	85. <i>Eriochloa</i>	
128. Glumes markedly unequal in length, sometimes lower glume absent		129
Glumes \pm equal in length		134
129. Glumes and lemmas with reddish pink hairs	93. <i>Rhynchelytrum</i>	130
Glumes and lemmas without reddish pink hairs		
130. Awns of lemmas geniculate	69. <i>Arundinella</i>	131
Awns of lemmas not geniculate		
131. Lower glumes 3-5-nerved		132
Lower glumes 1-nerved		133
132. Rachillas with long silky hairs	38. <i>Phragmites</i>	
Rachillas without long silky hairs	74. <i>Echinochloa</i>	
133. Lemmas with awns 0.5-1.5 mm long	11. <i>Dactylis</i>	
Lemmas with awns 5 mm or more long	9. <i>Vulpia</i>	
134. Spikelets solitary, ca 2 mm long, excluding awns	26. <i>Polypogon</i>	135
Spikelets usually 2 or 3 together, 2.5 mm or more long, excluding awns		
135. Awns of lemmas up to 1 mm long	78. <i>Oplismenus</i>	136
Awns of lemmas 2 mm or more long		

136. Inflorescences dense spike-like panicles	13. <i>Cynosurus</i>	
Inflorescences open panicles		137
137. Racemes with 3–7 pairs of spikelets; 1 spikelet of each pair sessile, the other pedicellate	110. <i>Vetiveria</i>	
Racemes with 1–2 groups of spikelets, each group with 2–3 spikelets; if 2 spikelets per group then 1 spikelet sessile and 1 pedicellate; if 3 spikelets per group then 1 spikelet sessile and 2 spikelets pedicellate	109. <i>Chrysopogon</i>	
138. Florets 1 per spikelet; spikelets with 2 glumes and 1 lemma		139
Florets 2 or more per spikelet or sessile spikelets with 2 florets and pedicellate spikelets with 1 floret; spikelets with 2 glumes and 2 or more lemmas		146
139. Spikelets falling entire at maturity		140
Spikelets breaking up at maturity above persistent glumes		141
140. Lemmas glabrous	28. <i>Alopecurus</i>	
Lemmas villous	25. <i>Agrostis</i>	
141. Lemmas rigid at maturity; awns arising at apex	5. <i>Stipa</i>	
Lemmas not rigid at maturity; awns often arising on back of lemmas, below apex		142
142. Glumes with short stiff hairs or bristles along keel	30. <i>Echinopogon</i>	
Glumes without short stiff hairs or bristles along keel		143
143. Awns geniculate		144
Awns not geniculate		145
144. Lemmas villous	25. <i>Agrostis</i>	
Lemmas not villous but scabrous	24. <i>Deyeuxia</i>	
145. Awns up to 0.1 cm long	24. <i>Deyeuxia</i>	
Awns 0.6–5 cm long	31. <i>Dichelachne</i>	
146. Spikelets in pairs, one spikelet of pair sessile, the other pedicellate, sessile and pedicellate spikelets usually dissimilar, or spikelets dimorphic, outer spikelets sterile and surrounding inner fertile spikelets		147
Spikelets not in pairs, or if in pairs then both spikelets either sessile or pedicellate, all spikelets similar		150
147. Spikelets several in groups, either sterile or fertile, sterile spikelets reduced to 10–14 lemmas and surrounding fertile spikelets which have 2 fertile florets	13. <i>Cynosurus</i>	
Spikelets in pairs, one sessile and one pedicellate, each with 2 lemmas, pedicellate spikelets often reduced		148
148. Rachis internodes and pedicels without a translucent midline	107. <i>Sorghum</i>	
Rachis internodes and pedicels with a translucent midline between thickened margins		149
149. Inflorescences compound panicles with capillary branches	108. <i>Capillipedium</i>	
Inflorescences simple racemose panicles	111. <i>Bothriochloa</i>	
150. Lemmas with 2 lobes, each lobe <i>ca</i> 7–9 mm long, awn arising in sinus between lobes and <i>ca</i> as long as lobes	40. <i>Monachather</i>	
Lemmas not lobed or if lobed then lobes much less than 7 mm long and awn longer than lobes		151
151. Awns or at least 1 awn per spikelet geniculate and/or twisted at base		152
Awns not geniculate and never twisted at base		158
152. Awns arising from sinus between two lobes at apex of lemma or arising at tip of lemma		153
Awns arising on back of lemma, usually well below apex		154

153. Glumes subequal, 0.7–1.9 cm long	39. <i>Danthonia</i>
Glumes unequal, upper longer, lower glume 0.3–0.45 cm long	69. <i>Arundinella</i>
154. Spikelets with 2 lemmas, lower lemma awned from near base, upper lemma unawned	21. <i>Arrhenatherum</i>
Spikelets with 2 or 3 lemmas, if 2 lemmas then both awned, the awns arising above the base of lemmas or lower lemma unawned and upper lemma awned	155
155. Inflorescences dense spike-like panicles	156
Inflorescences open panicles	157
156. Lemmas 3, all awned, awns arising at about middle of back of lemmas	17. <i>Trisetum</i>
Lemmas 3, lower 2 awned, uppermost lemma not awned, lowermost lemma with awn arising above middle of back of lemma, second lemma with awn arising below middle of back of lemma	23. <i>Anthoxanthum</i>
157. Glumes more than 1 cm long	16. <i>Avena</i>
Glumes less than 1 cm long	19. <i>Aira</i>
158. Lower glumes minute or absent, upper glumes \pm as long as spikelet	159
Lower glumes conspicuous, upper glumes variable in length or both glumes minute	160
159. Spikelets 3–5 mm long	85. <i>Eriochloa</i>
Spikelets 1.5–2 mm long	94. <i>Melinis</i>
160. Lower glumes 1-nerved or minute	161
Lower glumes 2–11-nerved	170
161. Glumes 1.2–3.6 cm long	162
Glumes up to 1 cm long	163
162. Glumes 1–5-nerved; spikelets not pendulous	15. <i>Bromus</i>
Glumes 7–11-nerved; spikelets pendulous	16. <i>Avena</i>
163. Glumes less than 1 mm long	3. <i>Microlaena</i>
Glumes 1 mm or more long	164
164. Glumes longer than lemmas	20. <i>Holcus</i>
Glumes as long as or shorter than lemmas	165
165. Upper and lower glumes \pm equal in length; margins of glumes fringed with long translucent hairs	42. <i>Elytrophus</i>
Upper and lower glumes unequal in length; margins not fringed with long translucent hairs	166
166. Lemmas with 2 or more teeth	56. <i>Diplachne</i>
Lemmas not toothed	167
167. Spikelets 2–4 mm long	18. <i>Rostraria</i>
Spikelets 5 mm or more long	168
168. Spikelets in dense clusters	11. <i>Dactylis</i>
Spikelets not in dense clusters	169
169. Awns 0.1–0.4 cm long	8. <i>Festuca</i>
Awns 0.5–1.5 cm long	9. <i>Vulpia</i>
170. Lemmas with long silky hairs on lower $\frac{1}{4}$ – $\frac{1}{3}$ of back; inflorescences large and showy	37. <i>Arundo</i>
Lemmas without long silky hairs on lower $\frac{1}{4}$ – $\frac{1}{3}$ of back; inflorescences not large and showy	171
171. Spikelets with 3–14 lemmas	172
Spikelets with 2 lemmas	174

172. Glumes exceeding remainder of spikelet	16. <i>Avena</i>	
Glumes shorter than remainder of spikelet		173
173. Spikelets with 1 fertile floret and 2 lower florets reduced to lemmas	4. <i>Ehrharta</i>	
Spikelets with 3 or more fertile florets	15. <i>Bromus</i>	
174. Lower glumes 1.5 cm or more long	16. <i>Avena</i>	
Lower glumes up to 1.2 cm long		175
175. Glumes \pm equal in length	44. <i>Eriachne</i>	
Lower glume conspicuously shorter than upper glume	74. <i>Echinochloa</i>	

1. LEERSIA Solander ex Swartz

Mostly perennials with creeping rhizomes. Ligules membranous; leaf blades flat or convolute, margins often harshly scabrid. Inflorescences open oblong panicles; spikelets solitary, shortly pedicellate, imbricate, strongly laterally compressed, falling entire from pedicel, bisexual, florets 1; glumes \pm absent; lemma boat-shaped, usually 5-nerved, typically spinulose-scabrid, muticous, rarely subulate-caudate or awned; palea resembling lemma, narrower, 3-nerved; stamens 6, rarely 1–3; stigmas 2. Caryopses free from lemma and palea, compressed laterally.

15 species, tropical and warm temperate; 2 species, 1 naturalized, Australia; 1 species south-eastern Queensland.

1. *Leersia hexandra* Swartz

SWAMP RICEGRASS

Aquatic or semi-aquatic perennial; culms up to 1 m tall, often decumbent and rooting freely at lower nodes in mud, then erect, nodes silky pubescent, becoming glabrous. Ligules 2–3 mm long; leaf blades green or sometimes glaucous, narrow, flat, subulate, mostly 10–20 cm \times 0.4–0.8 cm, scabrid on margin and midrib beneath. Panicles narrow, 5–12 cm long, branches ascending, filiform, flexuose; spikelets straw-coloured or sometimes purplish, oblong-ovate, ca 3–4 mm \times ca 1.5 mm; lemma with conspicuous curved spines along keel, margin shortly spiny; anthers 6. **Fig. 17A.**

Mainly Moreton and Wide Bay districts where it is common in and beside swamps and creeks, but has been collected from Toowoomba and Mundubbera areas as well. Eaten by stock.

2. TETRARRHENA R. Br.

Perennial tufted grasses with creeping rhizomes. Ligules very short finely ciliate rims; leaf blades smooth. Inflorescences of spike-like racemes with usually rather distant spikelets; spikelets pedicellate, bisexual, florets 3, lower 2 reduced to lemmas; glumes persistent, subequal, acute, keeled, 5-nerved; sterile lemmas subequal to fertile one, awnless, glabrous, fertile lemma similar, with knob-like process at base forming hinge with appendage of upper sterile lemma; palea membranous, narrow, acute, keeled, faintly 1-nerved; stamens 4; styles free. Caryopses ellipsoid-obloid, compressed, enclosed in hardened lemma but free from lemma and palea.

6 species endemic in Australia; 1 species south-eastern Queensland.

1. *Tetrarrhena juncea* R. Br.

WIRY RICEGRASS; FOREST WIREGRASS

Scrambling wiry slender perennial; culms up to ca 1 m long, internodes retrorsely scabrid. Ligules very shortly pubescent; leaf blades narrowly oblong-subulate or linear-subulate, flat to inrolled, up to 11 cm \times 0.5 cm. Inflorescences up to ca 6 cm long; spikelets oblong-ovate, 5–6 mm \times ca 1.5 mm; lemmas all ca 5–5.5 mm long, 7-nerved, \pm smooth, fertile one laterally compressed. Caryopses and lemmas falling when mature, leaving widely divergent glumes on pedicels. **Fig. 17B.**

McPherson Ra., on rocky ledges or in tall eucalypt forest or heath country.

3. MICROLAENA R. Br.

Wiry perennials. Ligules short hyaline rims long-ciliate with sparse silky caducous hairs; leaf blades flat or convolute. Inflorescences of contracted loose panicles or simple racemes; spikelets solitary, pedicellate, laterally compressed, not falling entire, bisexual, florets 3, lower 2 reduced to lemmas; glumes unequal, membranous, lower small, ovate, 1-nerved, upper almost twice as long, otherwise similar; sterile lemmas much longer than glumes, laterally compressed, scabrid along keel and on terminal awn, lower 5-nerved, upper 7-9-nerved, fertile lemma much shorter than others, 5-nerved; palea shorter than lemma, thinly membranous, 1-nerved; callus acute, bearded; stamens 2-4, or 6; styles 2, free. Caryopses linear-obloid, compressed, free.

10 species Philippines, Java to Australia and New Zealand; 2 species Australia; 1 species south-eastern Queensland.

1. *Microlaena stipoides* (Labill.) R. Br. WEEPING GRASS; RICE MEADOWGRASS *Ehrharta stipoides* Labill.

Sometimes tufted, or sometimes with few or numerous very slender culms from scaly rhizome; culms 30-70 cm long, \pm smooth. Ligules often apparently without hairs; leaf blades dark or bright green, narrowly subulate, 7-17 cm \times 0.2-0.5 cm, pubescent or puberulent. Inflorescences usually nodding, 7-17 cm long; spikelets narrow, 0.8-1.2 cm long excluding awn; glumes 0.5-1 mm long; sterile lemmas *ca* 0.6-1.2 cm long, minutely scabrid, awns up to 3.5 cm long, minutely scabrid, fertile lemma unawned or with short point; stamens 4. **Fig. 17C.**

Widespread in the region, in shady or semishady areas in forests or around buildings, often in damp areas; locally common. Eaten by stock.

4. EHRHARTA Thunb.

Annuals or perennials. Ligules membranous; leaf blades flat or rolled, often auriculate. Inflorescences of usually contracted panicles or sometimes a raceme, spikelets solitary, shortly pedicellate, bisexual, florets 3, lower 2 reduced to lemmas; glumes subequal, usually shorter than spikelet; sterile lemmas equal or unequal, awned or awnless, one or both ridged or wrinkled, upper one often with basal appendage, fertile lemma shorter; palea 2-nerved, nerves close together; stamens 6, 3 or 1; styles 2, stigmas plumose. Caryopses ellipsoid; compressed.

27 species South Africa, Mascarenes, New Zealand; 6 species naturalized Australia; 2 species south-eastern Queensland.

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| 1. Spikelets 0.7-1.4 cm long; sterile lemmas awned, scabrid | 1. <i>E. longiflora</i> |
| Spikelets 0.2-0.4 cm long; sterile lemmas awnless and rounded apically,
transversely ridged | 2. <i>E. erecta</i> |

1. **Ehrharta longiflora* Smith ANNUAL VELDGRASS

Annual; culms tufted, usually simple, 30-60 cm tall, glabrous. Ligules often lacinate, glabrous; leaf blades subulate, base auriculate, margin often undulate and minutely scabrid, 6-24 cm \times 0.3-1.4 cm, glabrous or puberulent. Inflorescences narrow panicles up to 22 cm long, branches filiform, flexuose; spikelets narrowly oblong-ovate, 0.7-1.4 cm long excluding awns; glumes mucronate, 3-6 mm long, lower 5-nerved, upper 7-nerved; sterile lemmas unequal, 0.6-1.2 cm long, scabrid on upper half, small tufts of hairs at base, awn terminal, straight, 0.2-2 cm long, scabrid; stamens 6. **Fig. 17D.**

Native of South Africa; reported as a weed of Toowoomba area.

2. **Ehrharta erecta* Lam. PANIC VELDGRASS *Ehrharta panicea* Smith

Loosely tufted or rambling perennial; culms up to 45 cm tall, glabrous. Ligules often lacinate, glabrous; leaf blades subulate, base auriculate, margin undulate and often pubescent, 4-18 cm \times 0.3-1.2 cm, glabrous or puberulent. Panicles erect or nodding,

lemma acute, 1.5–2.5 mm long, glabrous except for silky tuft of hairs at base, verruculose, awn terminal, straight or curved, 1.7–3 cm long, scabrid. **Fig. 17E.**

Mainly on foothills or mountain ranges in rainforest or depauperate rainforest or the junction between rainforest and eucalypt open forest, e.g. McPherson Ra., Great Dividing Ra. but a few records from drier areas as well.

2. *Stipa verticillata* Nees ex Sprengel

SLENDER BAMBOO GRASS

Stipa micrantha R. Br.; *Streptachne verticillata* (Nees ex Sprengel) Trin. & Rupr.

Stout tufted perennial up to 1 m, rarely 2 m tall; culms developing from scaly buds forming contracted rhizomatous base, rigid, erect or somewhat pendulous at tips, nodes prominent, glabrous, often branched or fascicled at nodes. Ligules truncate, 1–2 mm, rarely –8 mm long, ciliate on outer edges; leaf blades narrow, attenuate, varying greatly in length, somewhat pubescent or scabrous-pubescent. Panicles lax, narrow, up to 50 cm long, branches numerous, clustered in whorls, filiform; glumes narrow, blunt or truncate-laciniate, slightly unequal with lower longer, 3–4 mm long, 3-nerved, minutely scabrid mainly on nerves; lemma *ca* 3 mm long, silky puberulent, verruculose, awn terminal, curved or geniculate, 2–5 cm long, scabrid.

Widespread in the region, except the Wide Bay district, usually in eucalypt open forest or brigalow forest.

3. *Stipa scabra* Lindl.

Slender to robust tufted perennial up to 90 cm tall; culms erect, compressible, nodes glabrous. Leaves fine in a basal tuft; ligules *ca* 0.5–2 mm long, glabrous or rarely lacerated with ciliate margin; leaf blades narrow, usually convolute, attenuate, variable in length, scabrous to scabrous-pubescent. Panicles rather narrow, usually dense, up to 30 cm long, branches \pm erect; glumes narrow, acute to long attenuate, equal or unequal with lower longer, 0.7–1.9 cm long, 3- or 5-nerved; lemma \pm acute, 4.5–6 mm long, pubescent with short or long hairs, awn terminal, geniculate or curved, 4.5–7.5 cm long, scabrid-pubescent; basal callus long silky hairy.

Two subspecies occur in the region:

- | | | | | | | | | | |
|--------------------------|---|---|---|---|---|---|---|---|--|
| 1. Inflorescences narrow | : | : | : | : | : | : | : | : | <i>S. scabra</i> subsp. <i>scabra</i> |
| Inflorescences spreading | : | : | : | : | : | : | : | : | <i>S. scabra</i> subsp. <i>falcata</i> |

S. scabra* subsp. *scabra (*S. setacea* auct non R. Br., Benth.), ROUGH SPEARGRASS, is recorded from the Darling Downs and Burnett districts, and McPherson Ra. in the Moreton district. ***S. scabra* subsp. *falcata*** (Hughes) S. Jacobs & Everett (*S. falcata* Hughes), SLENDER SPEARGRASS, has been recorded from southern Darling Downs district.

S. nodosa S. T. Blake (*S. effusa* Hughes; *S. falcata* var. *minor* J. Black) has been recorded once from Wallangarra in southern Darling Downs district but its usual range is southern New South Wales, Victoria and South Australia. It can be distinguished from ***S. scabra*** by its numerous coarse culm leaves.

4. *Stipa densiflora* Hughes

Stipa congesta Summerh. & C. E. Hubbard

Robust tufted perennial up to *ca* 1.5 m tall; culms erect, arising from very contracted scaly rhizome, finely pubescent. Ligules *ca* 0.5–4 mm long, ciliate; leaf blades narrow, convolute, very variable in length, narrow, pubescent. Panicles contracted, spike-like, up to 30 cm long, branches short, clustered at nodes, clusters overlapping in lower part of axis; glumes narrow, aristate, 1.2–1.8 cm long, 3-nerved, minutely pubescent; lemma acute, 5–6 mm long, silky pubescent, scabrid in upper part, awn terminal, geniculate, slightly curved but not falcate, 3–4.5 cm long, plumose in lower half.

Darling Downs district in the Stanthorpe-Wallangarra area, generally in granitic or sandy soils in open forest.

5. *Stipa setacea* R. Br.

CORKSCREW GRASS

Dichelachne setacea (R. Br.) Nees; *Stipa setacea* var. *latiglumis* J. M. Black; *S. brachystephana* S. T. Blake

Slender tufted perennial up to 75 cm tall; culms erect, nodes glabrous. Ligules rounded



Fig. 17 POACEAE — A₁–A₂ *Leersia hexandra*, A₁ habit x 1, A₂ spikelet showing spinulose lemma x 6; B *Tetrarrhena juncea*, spikelet x 6; C *Microlaena stipoides*, spikelet x 6; D *Ehrharta longiflora*, spikelets x 3; E–F *Stipa* spp. — E *S. ramosissima*, part inflorescence showing whorl of branchlets at nodes x $\frac{3}{4}$; F *S. setacea*, spikelet x 3.

apically, 2–4(–9) mm long, glabrous or minutely scabrous; leaf blades narrow, convolute, attenuate, variable in length, minutely scabrid. Panicles lax, up to *ca* 20 cm long, branches filiform; glumes narrowly obovate, abruptly acuminate to long attenuate, unequal with lower glume longer and narrower, 0.6–1.2 cm long, 3- or 5-nerved, minutely scabrid; lemma 4.5–6 mm long, silky pubescent, awn terminal, geniculate, 2.5–4 cm long, scabrid. **Fig. 17F.**

Darling Downs district, usually in eucalypt open forest on sandy soil.

6. *Stipa rudis* Sprengel

Robust, tufted perennial up to 1.2 m tall; culms erect, finely pubescent at nodes. Ligules *ca* 0.5 mm long, truncate, slightly pubescent; leaf blades narrow, attenuate, variable in length, scabrous to scabrous-pubescent. Panicles lax or loosely contracted, up to 40 cm long, branches few at nodes, longer ones again divided; glumes narrow, truncate, acute or irregularly dentate, unequal with lower glume longer, 0.7–1.5 cm long, 3–5-nerved, glabrous to minutely pubescent; lemma \pm acute, 6–9 mm long, silky pubescent, verruculose, awn terminal, geniculate or slightly curved, 2–7 cm long, scabrid-pubescent.

Two subspecies occur in the region:

- | | |
|--|---------------------------------------|
| 1. Lower glume 1.1–1.5 cm long, upper 0.9–1.3 cm long; lemma 8–9 mm long; column of awn 2–2.5 cm long | <i>S. rudis</i> subsp. <i>rudis</i> |
| Lower glume 0.9–1.2 cm long, upper 0.7–1 cm long; lemma <i>ca</i> 6–8 mm long; column of awn less than 2 cm long | <i>S. rudis</i> subsp. <i>nervosa</i> |

S. rudis subsp. *rudis* (*S. nervosa* var. *neutialis* Vickery) has been recorded from Moreton, Darling Downs and Burnett districts, on hard red, granite derived or sandstone derived soils, in eucalypt open forest. *S. rudis* subsp. *nervosa* (Vickery) Everett & S. Jacobs (*S. nervosa* Vickery) has been recorded from southern Darling Downs district on granite or basalt derived soils.

7. *Stipa aristiglumis* F. Muell.

PLAINS GRASS

Stipa fusiformis Hughes

Robust tufted perennial 0.3–1.2(–2) m tall; culms erect, arising from very contracted scaly rhizome, glabrous. Ligules *ca* 0.5–1 mm long, ciliate on outer edge; leaf blades narrow, convolute, very variable in length, glabrous. Panicles loose, up to 45 cm long, branches filiform, clustered at nodes, clearly separated in lower part of axis; glumes narrow, acute to attenuate, 0.6–1.4 cm long, 3–5-nerved, glabrous; lemma acute, 5.5–6.5 mm long, silky pubescent, awn terminal, geniculate, slightly curved, 2.5–4 cm long, scabrid.

Mainly Darling Downs district on heavy black soils, but also recorded from Burnett and Moreton districts.

8. *Stipa pubescens* R. Br.

TALL SPEARGRASS

Stipa commutata Trin. & Rupr.

Robust tufted perennial up to 2 m tall; culms erect, arising from very contracted scaly rhizome, finely pubescent at least at nodes. Ligules *ca* 0.5–1 mm long, sometimes ciliate on outer edge; leaf blades narrow, convolute, very variable in length, puberulent to glabrous. Panicles loose, up to *ca* 45 cm long, branches clustered at nodes, clearly separated on lower part of axis; glumes narrow, truncate, notched or toothed, unequal with lower glume longer, to subequal, 1.2–3 cm long, 3–5-nerved, minutely pubescent; lemma acute, 0.9–1.5 cm long, silky pubescent, verruculose, awn terminal, geniculate, slightly curved, 5–10 cm long, scabrid.

Moreton and Darling Downs districts on shallow sandy or granite derived soils in open forest.

Stipa nodosa S. T. Blake (*S. effusa* Hughes; *S. falcata* var. *minor* J. Black) has been recorded once from Wallangarra on the Queensland-New South Wales border, though its usual distribution is southern New South Wales, Victoria and South Australia. It can be distinguished from *S. aristiglumis* by the awn being 4.5–10 cm long, and from *S. pubescens* by the lemma being 4–7 mm long, including callus.

6. GLYCERIA R. Br.

Perennials with creeping rhizomes. Ligules membranous, often lacerate; leaf blades flat. Inflorescences open or contracted panicles; spikelets solitary, pedicellate, not falling entire, rachilla disarticulating above glumes and between lemmas, bisexual, florets few-many; glumes persistent, unequal, mostly faintly 1-nerved at base; lemmas 4-20, exserted from glumes, broad, awnless, 3-9-nerved, upper ones often sterile; paleas as long as or longer than lemmas, 2-keeled; stamens 3; ovary glabrous, styles free, plumose. Caryopses ovoid-obloid, dorsally compressed.

40 species cosmopolitan, especially North America; 5 or 6 species Australia; 1 species south-eastern Queensland.

1. **Glyceria maxima* (Hartm.) Holmberg

REED SWEETGRASS;
WATER MEADOWGRASS

Molinia maxima Hartm.; *Glyceria aquatica* (L.) Wahlb.; *Poa aquatica* L.

Robust leafy perennial 0.9-2.5 m tall; culms arising from stout, extensively spreading rhizomes, erect, nodes several, glabrous. Ligules rounded or acute, 3-7 mm long; leaf blades narrow, acute, ca 25-60 cm × ca 0.7-2 cm, ± scabrous along margin and midrib beneath, otherwise glabrous. Panicles open, spreading, up to 45 cm long, branches numerous, slender, usually clustered along axis; spikelets all similar, greenish yellow, narrowly oblong, 0.5-1.2 cm × 0.2-0.35 cm, florets 4-10, uppermost may be reduced; glumes membranous, ± ovate, membranous, 1-nerved, lower glume 2-3 mm long, upper 3-4 mm long; lemmas all alike, ovate-elliptic, apically rounded and also rounded across back, 3-4 mm long, 7-nerved, scabrid at least on lower half. **Fig. 18A.**

Native of Europe and temperate Asia; recorded from southern Moreton and Darling Downs districts, usually in wet swampy situations and on stream banks.

7. POA L.

Tufted annuals or perennials, sometimes rhizomatous or stoloniferous. Ligules membranous or reduced to short hairy rim; leaf blades flat, involute or folded. Inflorescences open or contracted panicles; spikelets solitary, pedicellate, laterally compressed, not falling entire, rachilla disarticulating above glumes and between lemmas, bisexual, florets 2-several, uppermost reduced; glumes unequal, acute, keeled, 1- or 3-nerved; lemmas acute rarely obtuse, keeled, 5-nerved, ± hairy on back towards base; paleas slightly shorter than lemmas, 2-keeled, scabrous or ciliate on keels; callus short, often with loose woolly hairs (web); stamens 3; ovary glabrous, styles short, stigmas plumose. Caryopses ovate, oblong or linear in outline, often grooved, free or adherent to palea.

About 300 species cosmopolitan, mainly cooler areas; ca 40 species Australia; 7 species south-eastern Queensland.

- | | | |
|---|----------------------------|---|
| 1. Small winter-spring flowering annuals less than 30 cm tall | 1. <i>P. annua</i> | 2 |
| Summer flowering perennials generally more than 30 cm tall | | |
| 2. Ligules 1-5 mm long; leaf blades flat | | 3 |
| Ligules up to 1 mm long; leaf blades mostly closely folded or inrolled | | 5 |
| 3. Leaf blades 0.4-1.5 cm wide; loosely tufted plant | 2. <i>P. queenslandica</i> | 4 |
| Leaf blades 0.1-0.4(-0.6) cm wide; rhizomatous plants | | |
| 4. Spikelets 0.5-1.1 cm long; web obsolete | 3. <i>P. fordeana</i> | |
| Spikelets 0.25-0.6 cm long; web copious, of long crinkled hairs | 4. <i>P. pratensis</i> | |
| 5. Leaf blades inrolled-terete, fine to very fine, and finely pointed; web scanty or absent | 5. <i>P. sieberiana</i> | |
| Leaf blades ± inrolled, folded or occasionally flat, 1-4 mm wide; web usually copious, sometimes scanty | | 6 |

6. Inflorescences narrow panicles, branches erect or ascending; leaves
scabrous or scabrous-pubescent
Inflorescences with branches spreading at base, contracted above; leaves
glabrous or minutely pubescent

6. *P. labillardieri*7. *P. cheelii***1. **Poa annua* L.****ANNUAL POA; WINTER GRASS**

Soft glabrous annual 2–30 cm tall; culms erect spreading or prostrate, sometimes geniculate or rooting at lower nodes. Ligules obtusely truncate, 2–5 mm long, glabrous; leaf blades linear, apex blunt, 0.5–12 cm × 0.1–0.5 cm, soft, minutely scabrous on margin. Inflorescences open panicles 3–12 cm long, branches capillary, ± stiffly spreading; spikelets ovate or oblong, 3–5.5 mm long, florets 3–10; glumes keeled, smooth or rarely scabrous on keels, lower 1.5–3 mm long, 1–3-nerved; upper 2–4 mm long, 3-nerved; lemmas oblong, broad, apex very obtuse to almost truncate, hyaline, 2.5–4 mm long, prominently 5-nerved, nerves all densely hairy below middle; palea densely fringed with long fine hairs on keels, rarely hairless, back glabrous; web absent. **Fig. 18B.**

Originally native of Europe but now very widespread in temperate regions; naturalized in damp or shady areas, often a weed in lawns and disturbed sites, flourishing during winter and early spring.

2. *Poa queenslandica* C. E. Hubbard**QUEENSLAND POA**

Tall loosely tufted perennial, base of shoots clothed in broad thin distinctly nerved scales; culms ascending or erect, 0.5–1.5 m tall, glabrous. Ligules membranous, truncate or lacinate, 2–4 mm long; leaf blades linear, flat, apex attenuate, base somewhat auriculate, up to 40 cm × 0.4–1.5 cm, nerves widely spaced, glabrous, minutely scabrous on nerves. Inflorescences loose panicles 12–40 cm long, branches spreading, capillary; spikelets ovate to oblong, 3–6 mm long, florets 2–4, rarely –6; glumes ± ovate, blunt to acute, subequal or upper a little longer, lower 1.5–2.2 mm long, 1–3-nerved, upper 2–2.5 mm long, 3-nerved; lemmas ovate-oblong, obtuse or blunt, 2.5–3 mm long, prominently 5-nerved, minutely scabrid; palea minutely scabrid on most of keels and back; web absent.

Moreton and Darling Downs districts mostly at moderate to high altitudes, in or on margins of rainforest.

3. *Poa fordeana* F. Muell.**SWEET SWAMPGRASS**

Glyceria fordeana (F. Muell.) Benth.

Perennial, rhizome creeping, shoots arising singly or in loose fascicles, rhizomes and lower part of shoots clothed with broad loose papery scales; culms ascending to erect, sometimes rooting at lower nodes, 20–100 cm tall, striate, scabrous. Ligules membranous, obtuse or ± truncate, 1–5 mm long; leaf blades linear-attenuate, flat, apex acute, base often slightly auriculate, 5–30 cm × 0.15–0.4 cm, prominently nerved, ± scabrous. Inflorescences at maturity narrowly or broadly oblong panicles 6–45 cm long, branches divaricately spreading or slightly reflexed, ± scabrous; spikelets linear-ovate to narrowly elliptic, 0.5–1.1 cm long, florets 3–12; glumes narrowly ovate to ovate, apex acute to obtuse, margin membranous, ± subequal, 3–4 mm long, 3-nerved or upper rarely 5-nerved; lemmas keeled, oblong when flattened, apex obtuse, membranous margin widest at apex, 3.5–5 mm long, 5-nerved, woolly hairy on lower part of back, longer hairs on keels and base of lateral nerves; palea furrowed between keels, finely scabrid on keels above; web obsolete.

Darling Downs district in wet or poorly drained situations such as swamps or river flats.

4. **Poa pratensis* L.**KENTUCKY BLUEGRASS**

Poa angustifolia L.

Variable perennial, rhizomes slender, creeping, with pointed scale leaves, extravaginal shoots present, forming loose to compact tufts or turf; culms erect or ascending, 10–90 cm tall. Ligules membranous, usually obtuse or truncate, 1–3 mm long; leaf blades linear, flat or folded, abruptly narrowed to acute or blunt apex, up to 30 cm × 0.1–0.4(–0.6) cm, glabrous or puberulent, slightly scabrous. Inflorescences of ovate to oblong panicles 1–15 cm long, branches capillary, spreading; spikelets ovate to oblong, 2.5–6 mm long, florets 2–5; glumes ovate, acute to acuminate, unequal, ± scabrous along keel, lower 1.5–3.5 mm long, 1–3-nerved, upper 2–4 mm long, 3–5-nerved; lemmas oblong

to oblong-ovate, acute to \pm obtuse, margin broadly membranous at apex, narrower on sides, 5-nerved, puberulent to pubescent on nerves up to *ca* middle; palea scabrid on keels, glabrous on back; web copious, consisting of long fine crinkled hairs.

Native of northern temperate regions of the world; possibly naturalized in cooler moister districts, e.g. southern Darling Downs district, prefers rich soils.

5. *Poa sieberiana* Sprengel

SNOWGRASS; FINELEAF TUSSOCK GRASS

Poa australis R. Br. var. *sieberiana* (Sprengel) J. D. Hook.; *P. implexa* Trin.; *P. caespitosa* G. Forster var. *australis* Benth.

Densely tufted usually greyish green perennial; culms usually much longer than leaves, 15–80 cm, rarely –100 cm tall, smooth to scabrous. Ligules truncate, 0.1–1 mm long, minutely ciliate at apex; leaf blades \pm inrolled-terete, fine and finely pointed, 5–60 cm long, scabrous or occasionally sparsely hirsute, inner surface usually densely scabrous-pubescent. Inflorescences of panicles 3–20 cm long, branches capillary, at first erect, widely spreading at maturity; spikelets \pm ovate, 3–7 mm long, florets 2–7; glumes \pm ovate, acute to acuminate, subequal or upper glume longer, lower 1.5–2.5 mm long, 1–3-nerved, upper 2–3 mm long, 3-nerved, scabrid at least on keel; web scanty or absent; lemmas oblong to oblong-ovate, obtuse to subacute, 2–4 mm long, 5-nerved, \pm pubescent on lower back, often longer hairs on keel as well; palea finely scabrid on keels in upper part, finely ciliate below middle, scabrid or scabrid-pubescent on back; web scanty or absent.

Two varieties occur in the region:

- | | |
|--|---|
| 1. Leaves glabrous to scabrous; plant tufted | <i>P. sieberiana</i> var. <i>sieberiana</i> |
| Leaves hirsute, sometimes distantly so; plant tufted but extravaginal shoots often present | <i>P. sieberiana</i> var. <i>hirtella</i> |

P. sieberiana var. *sieberiana* has been recorded from southern Moreton district and Darling Downs district usually in open forest. *P. sieberiana* var. *hirtella* Vickery has been recorded from southern Darling Downs district, around Applethorpe and Girraween National Park.

6. *Poa labillardieri* Steudel

TUSSOCK GRASS

Coarse densely tufted generally scabrous perennial, not or very rarely producing a rhizome; culms 0.3–1.2 m tall. Ligules truncate, *ca* 0.5 mm long, minutely pubescent; leaf blades linear, flat or inrolled, attenuate, up to 80 cm \times 0.1–0.35 cm, \pm scabrous to scabrous-pubescent. Inflorescences of rather narrow panicles 10–25 cm long, branches erect or ascending, capillary; spikelets narrowly ovate, strongly laterally compressed, 3–7 mm long, florets 3 or 4, rarely –8; glumes narrowly ovate to ovate, obtuse to subacute, subequal or upper a little longer, 2–3 mm long, 3-nerved, scabrid on keel and towards apex; lemmas narrow to moderately broad, apex obtuse, (2.5–)3.5–4(–4.5) mm long, keeled, 5-nerved, usually hairy towards base, minutely scabrid upwards; palea scabrid on keels on upper $\frac{2}{3}$, smooth, scabrid to pubescent on back; web of usually copious long hairs. **Fig. 18C.**

Moreton, Wide Bay and eastern Darling Downs districts, mostly at moderate to high altitudes, and often in moister areas such as creek banks or moist eucalypt forest.

7. *Poa cheelii* Vickery

Perennial, shoots extravaginal, arising singly or in fascicles from a loosely contracted or subelongate rhizome, rhizome and shoot buds clothed in short broad scales; culms mostly 40–100 cm tall, usually exceeding leaves, glabrous. Ligules membranous, truncate, *ca* 0.5 mm long, minutely pubescent; leaf blades linear, usually flat, apex abruptly acute, mostly 8–25 cm \times 0.1–0.4 cm, often minutely pubescent. Inflorescences panicles 8–25 cm long, loose at base, somewhat contracted above, branches capillary, scabrous; spikelets \pm ovate, 4–7 mm long, florets 3–6; glumes moderately broad, somewhat keeled, 3-nerved, unequal, lower 2–3.5 mm long, upper 2.5–4 mm long, slightly scabrid on nerves; lemmas \pm oblong, obtuse, 3–4.5 mm long, minutely scabrid on keel above, minutely pubescent at base; palea furrowed down back, sparsely scabrid-pubescent on back, finely and densely scabrid on keels on upper half; web long, scanty or \pm copious.

Recorded from McPherson Ra. on slopes of Mt Ballou in moist eucalypt forest.

8. *FESTUCA* L.

Tufted perennials; culms erect or spreading. Ligules membranous; leaf blades flat, convolute or bristle-like. Inflorescences of lax or contracted panicles; spikelets solitary, pedicellate, not falling entire, rachilla disarticulating above glumes and between lemmas, bisexual, florets 2-many, uppermost reduced; glumes unequal, narrow, acute, lower 1-nerved, upper 3-5-nerved; lemmas acute or rarely obtuse, rounded on back, obscurely 5-nerved, mucronate or awned from the tip or from minutely bifid apex; paleas slightly shorter than lemmas, 2-keeled; stamens 3; styles short, stigmas plumose. Caryopses obloid to narrowly obconical, grooved or concave in front, tightly enclosed by lemma and palea.

80 species cosmopolitan; 13 species Australia; 1 species south-eastern Queensland.

1. **Festuca arundinacea* Schreber

TALL FESCUE

Tufted perennial 0.5-1.8 m tall; culms mostly erect, often stout, unbranched, smooth. Ligules truncate, ca 1 mm long, minutely ciliolate on back; leaf blades narrow, flat, attenuate, often auriculate at base, 10-60 cm \times 0.3-1.2 cm, scabrous at least on margin. Inflorescences narrow panicles, erect or nodding, 10-50 cm long; spikelets \pm elliptic or narrowly ovate, 1-1.8 cm long, florets 3-10; glumes \pm narrowly ovate, acute to acuminate, margin broadly membranous, unequal, lower 3.5-6 mm long, upper 4.5-7 mm long; lemmas \pm ovate-elliptic, apex tapered, 7-10 mm long, midnerve usually extended into a subterminal 1-4 mm long awn; palea elliptic, keels rough, thickened, back membranous. **Fig. 18D.**

Native of Europe and temperate Asia; naturalized in southern Darling Downs district, e.g. Stanthorpe area. Grown for pasture and forage mainly in temperate Australia but can be poisonous to stock.

9. *VULPIA* C. C. Gmelin

Slender erect annuals; culms tufted or solitary. Ligules membranous; leaf blades linear, convolute or involute, usually bristle-like. Inflorescences narrow usually 1-sided panicles; spikelets solitary, pedicellate, not falling entire, disarticulating above glumes and between lemmas, florets 5-10, bisexual, often cleistogamous; glumes very unequal, lower shorter than upper and minute or subulate, 1-nerved, upper subulate, 1-3-nerved; lemmas subulate and produced into terminal awn, faintly 5-nerved; paleas 2-keeled; callus short, obtuse, glabrous; stamens 1-3; stigmas sessile, plumose. Caryopses linear, dorsally compressed, concave in front, \pm adherent to palea.

25-30 species, mainly temperate, especially Mediterranean region and western North and South America; 5 species Australia, all introduced; 3 species south-eastern Queensland.

- | | |
|---|------------------------|
| 1. Upper glumes less than twice as long as lower glumes | 1. <i>V. bromoides</i> |
| Upper glumes more than twice as long as lower glumes, usually 3-4 times as long | 2 |
| 2. Panicles usually well exserted from leaves at maturity | 2. <i>V. muralis</i> |
| Panicles usually partly enclosed by uppermost leaf at maturity | 3. <i>V. myuros</i> |

1. **Vulpia bromoides* (L.) Gray

SQUIRREL TAIL FESCUE

Festuca bromoides L.

Slender tufted annual 5-60 cm tall; culms erect or ascending from bent or prostrate base. Ligules membranous, up to 0.5 mm long; leaf blades linear, flat or inrolled, attenuate, 1-15 cm \times 0.05-0.3 cm, minutely scabrous on margin and towards tip, minutely pubescent on upper surface. Panicles narrow, well exserted from uppermost leaf sheath, 1-10 cm long, branches \pm erect; spikelets oblong-elliptic, 0.7-1.4 cm long; glumes narrowly ovate, acute to acuminate, unequal, upper less than twice length of lower, lower 3-6 mm long, 1-nerved, upper 5-10 mm long, 3-nerved; lemmas 5-9 mm long, scabrid at least near apex or on upper half, apex produced into fine awn 0.5-1.3 cm long.

Native of Europe and North Africa; recorded from Darling Downs and Moreton districts, often in moister localities at higher altitudes, e.g. Springbrook, Stanthorpe.

2. **Vulpia muralis* (Kunth) Nees

Festuca muralis Kunth

Slender tufted annual up to 45 cm tall, culms erect or ascending from bent or prostrate base. Ligules membranous, up to 0.5 mm long; leaf blades linear, flat or inrolled, attenuate, 1–10 cm × 0.05–0.2 cm, often minutely scabrous towards tip, often minutely puberulent on upper surface. Panicles narrow, usually well exerted from uppermost leaf sheath, 1.5–10 cm long, branches ± erect; spikelets ± elliptic, 6–10 mm long; glumes narrow to narrowly ovate, acute to acuminate, unequal, upper more than twice length of lower, lower 1–2.5 mm long, 1-nerved, upper 4–6.5 mm long, 1–3-nerved; lemmas 4–6 mm long, scabrous on upper $\frac{1}{3}$ – $\frac{1}{2}$, apex produced into fine awn 0.5–1.5 cm long.

Native of Mexico; recorded from Darling Downs, Wide Bay and Moreton districts, usually at higher altitudes, e.g. Stanthorpe, Bunya Mts.

3. **Vulpia myuros* (L.) C. C. Gmelin

Festuca myuros L.

Slender tufted annual up to ca 50 cm tall, culms erect or ascending from bent or prostrate base. Ligules membranous, up to ca 0.5 mm long; leaf blades linear, flat or inrolled, linear attenuate, 2–16 cm × 0.05–0.4 cm, ± minutely scabrous on margins and towards apex, minutely puberulent on upper surface. Inflorescences of narrow panicles often not very exerted from leaf sheath, 4–24 cm long, branches ± erect; spikelets oblong-elliptic, 0.5–1.2 cm long; glumes subulate to narrowly ovate, acute to acuminate, unequal, upper more than twice length of lower, lower 1–2 mm long, 1-nerved, upper 4–5 mm long, 1–3-nerved; lemmas 4.5–6 mm long, scabrous on upper $\frac{1}{3}$ – $\frac{2}{3}$, apex produced into fine awn 1–2 cm long. **Fig. 18E.**

Two forms occur in the region:

- | | | | | | | |
|--|---|---|---|---|---|--|
| 1. Lemmas glabrous on margin near apex | . | . | . | . | . | <i>V. myuros</i> forma <i>myuros</i> |
| Lemmas ciliate on margin near apex | . | . | . | . | . | <i>V. myuros</i> forma <i>megalura</i> |

Both native of Mediterranean regions of Europe, northern Africa and western Asia; *V. myuros* forma *myuros*, RAT'S TAIL FESCUE occurs in the Moreton and Darling Downs districts while *V. myuros* forma *megalura* (Nutt.) Stace & Cotton (*Festuca megalura* Nutt.; *V. megalura* (Nutt.) Rydb.; *V. myuros* var. *hirsuta* Hack.), FOX TAIL FESCUE occurs in the Moreton, Darling Downs and Wide Bay districts.

10. *BRIZA* L.

Loosely tufted annuals or perennials; culms erect or slightly bent at base. Ligules membranous, obtuse; leaf blades flat. Inflorescences of loose panicles with capillary branches and pedicels and nodding spikelets, or rarely reduced to a raceme; spikelets solitary, ± laterally compressed, not falling entire, rachilla disarticulating above glumes and between lemmas, florets 4–20, all bisexual, decreasing gradually in size towards apex of spikelet; glumes persistent, subequal, stiff, concave, 3–9-nerved, spreading horizontally; lemmas closely overlapping, stiff, broad, with wide scarious margin, concave, 5–9-nerved, nerves often obscure; paleas broad, shorter than lemmas, 2-keeled, keels often winged and minutely pubescent; stamens 3; styles distinct, short, stigmas plumose, laterally exerted. Caryopses compressed, tightly embraced by hardened part of lemma and palea, usually adherent to palea.

20 species, north temperate and South America, widely naturalized elsewhere; 3 species Australia; 2 species south-eastern Queensland.

- | | | | | | | | | |
|----------------------------|---|---|---|---|---|---|---|---------------------|
| 1. Spikelets 1–2.4 cm long | . | . | . | . | . | . | . | 1. <i>B. maxima</i> |
| Spikelets 0.3–0.5 cm long | . | . | . | . | . | . | . | 2. <i>B. minor</i> |

1. **Briza maxima* L.

QUAKING GRASS

Glabrous annual 30–60 cm tall. Ligules oblong or laciniate, 2–5 mm long; leaf blades tapered to acute apex, base slightly auriculate, 4–20 cm × 0.3–0.7 cm, minutely scabrous along margin and often on nerves towards leaf apex. Inflorescences narrowly oblong lax panicles or reduced to a raceme, 2–10 cm long; spikelets ovate, 1–2.4 cm × 0.6–1.3 cm, pedicels 0.9–2.5 cm long; glumes often dark brown or purplish, broadly ovate, obtuse,

lower slightly shorter than upper and 4.5–5.5 mm long, upper 5–6.5 mm long, 7–9-nerved; lemmas closely imbricate, broadly cordate-ovate, abruptly shortly acuminate, 6–9 mm long, 7–9-nerved, lower ones glabrous or very finely shortly pubescent, upper silky puberulent. **Fig. 18F.**

Native of the Mediterranean region; sporadic through most of the region, usually in moist fertile cool or shady habitats, sometimes a weed of lawns or gardens.

2. **Briza minor* L.

SHIVERY GRASS; LESSER QUAKING GRASS

Glabrous annual 5–60 cm tall. Ligules oblong, obtuse, 3–6 mm long; leaf blades linear-ovate, apex attenuate, 1.8–22 cm \times 0.2–1 cm, minutely scabrous along margin and often on nerves towards apex. Inflorescences well developed panicles ovate in outline, except in very depauperate specimens, 2–15 cm long; spikelets ovate or obtusely triangular, 3–5 mm \times 3.5–5 mm, pedicels 0.5–2.3 cm long; glumes broadly oblong-obovate, obtuse or abruptly acute, lower very slightly shorter than upper, lower 2–3 mm long, upper 2.2–3.2 mm long, 3-nerved; lemmas closely imbricate, hardened, shining and often greenish in middle, broadly cordate-ovate, obtuse tips often inflexed, margin broad, hyaline, very gibbous below, 1.5–3 mm long, glabrous, 7-nerved.

Native of the Mediterranean region; sporadic through much of the region, usually in moist or reasonably fertile shady areas, often a weed of disturbed sites or gardens.

11. DACTYLIS L.

Tufted perennials. Leaf blades flat. Inflorescences of lobed condensed panicles, branches 1-sided and crowded with compact fascicles of spikelets; spikelets strongly laterally compressed, almost sessile, florets 2–5; glumes persistent, unequal, 1–3-nerved; lemmas strongly compressed and keeled, herbaceous with membranous margins, 5-nerved, shortly awned; paleas shorter than or as long as lemmas.

5 species temperate Eurasia; 1 species naturalized Australia, occurring in south-eastern Queensland.

1. **Dactylis glomerata* L.

COCKSFOOT

Coarsely tufted perennial; culms erect or spreading, up to 1.4 m tall. Ligules membranous, minutely ciliate, 2–10 mm long; leaf blades linear, at first folded, then flat, acute, 10–45 cm \times 0.2–1.4 cm, minutely scabrous on margin and often lower surface, otherwise glabrous. Panicles narrowly oblong or ovate, 2–30 cm long; spikelets oblong-elliptic or somewhat cuneate, 6–9 mm long; glumes narrowly ovate to ovate, acuminate or acute, unequal, lower shorter than upper, lower 3–5 mm long, 1-nerved, upper 4–6.5 mm long, \pm 3-nerved, ciliate on keel; lemmas \pm equal, narrowly ovate, 4–7 mm long with point or awn 0.5–1.5 mm long, keel ciliate, particularly towards apex, 5-nerved; palea 2-nerved and 2-keeled, pubescent along keels, apex emarginate. **Fig. 18G.**

Native of Europe; naturalized in the Moreton and Wide Bay districts usually at higher altitudes or in better rainfall areas, e.g. Springbrook and Maleny areas.

12. LAMARCKIA Moench

Tufted annuals. Ligules thinly membranous; leaf blades thin, flat. Inflorescences of dense contracted panicles, branches spreading or somewhat reflexed; spikelets dimorphic, fertile spikelets \pm concealed by sterile; fertile spikelets with rachilla not disarticulating, terminating in much reduced lemma, florets 1 or 2, bisexual or 1 male, glumes narrow, finely acuminate, as long as spikelet, lemmas 2, broader than glumes, notched, dorsally awned, paleas narrow, 2-keeled, stamens 3, styles short, distinct, stigmas slender, barbellate; sterile spikelets with rachilla not disarticulating, glumes narrow, acuminate, lemmas distichously imbricate, usually 6–8, short and broad, not awned. Caryopses ellipsoid-obloid, slightly compressed, free, enclosed in unaltered lemma and palea.

1 species Mediterranean, naturalized in Australia, occurring in south-eastern Queensland.

1. **Lamarckia aurea* (L.) Moench**GOLDENTOP***Cynosurus aureus* L.

Short, \pm glabrous, \pm tufted annual up to 15 cm, rarely 40 cm tall; culms usually \pm erect. Ligules acute, up to 8 mm long; leaf blades narrow, attenuate, margin minutely scabrous, up to 20 cm \times 0.3–0.7 cm. Inflorescences of contracted panicles of densely packed fascicles, spikelets at maturity falling entire with fascicle; fertile spikelets *ca* 3–5 mm long, florets 2, lower bisexual, upper male or sterile, glumes very narrowly ovate, *ca* 4 mm long, 1-nerved, lemmas unequal, lower 2–2.5 mm long, upper *ca* 0.5 mm long, \pm 1-nerved, each with awn *ca* 6 mm long, from just below acute apex; sterile spikelets 1–3 per fascicle, florets numerous, all reduced to lemmas, glumes very narrowly ovate, *ca* 3–3.5 mm long, 1-nerved, lemmas all similar, papery, oblong-cuneate, rounded on back, apex broadly obtuse, laciniate, *ca* 1.5–2 mm long, 3-nerved. **Fig. 18H.**

Native of Mediterranean region; naturalized mainly in the Darling Downs district.

13. CYNOSURUS L.

Annuals or perennials. Ligules hyaline; leaf blades flat, \pm flaccid. Inflorescences usually dense spike-like panicles, often appearing secund by contortion of branches to one side; spikelets dimorphic, sterile usually surrounding fertile; fertile spikelets subsessile, rachilla readily disarticulating, florets 1–6, mostly bisexual, glumes subequal, 1-nerved, nerve extending into short awn, lemmas oblong to narrowly ovate, rounded on back, mucronate or subapically awned, 5-nerved, paleas subequal to lemmas, 2-keeled, 2-toothed, stamens 3, styles distinct, short, stigmas loosely plumose; sterile spikelets shortly pedicellate, glumes \pm similar to fertile spikelet, lemmas narrow, 1-nerved, at least lower ones awned, paleas absent. Caryopses oblong in outline, grooved in front, \pm adherent to lemma and palea.

3 or 4 species western Asia and northern Africa; 2 species naturalized Australia; 1 species south-eastern Queensland.

1. **Cynosurus echinatus* L.**ROUGH DOGSTAIL**

Annual with 1–few erect or ascending culms up to 90 cm tall. Ligules obtuse or laciniate, up to *ca* 7 mm long; leaf blades linear-subulate, attenuate, up to *ca* 20 cm \times 0.4–0.8 cm, glabrous, minutely scabrous on margins and towards apex on nerves. Panicles 1–5 cm long; fertile spikelets 6–7 mm long, florets 2, both bisexual, glumes subequal, hyaline, attenuate, 0.9–1.1 cm long, lemmas narrowly ovate, \pm equal, 5–6 mm long, scabrous on back in upper half, subapical awn 1.3–1.6 cm long; sterile spikelets 6–10 mm long, florets 10–14, all reduced to lemmas, lemmas narrowly ovate, 3–5 mm long, scabrous, awns 4–6 mm long. **Fig. 18I.**

Native of Mediterranean region; naturalized in higher altitude areas of the Darling Downs district, e.g. Stanthorpe area; occurrence sporadic.

14. LOLIUM L.

Tufted annuals or perennials. Ligules membranous; leaf blades flat. Inflorescences of terminal spikes of \pm erect spikelets; spikelets solitary, sessile, usually \pm compressed, distichous, florets bisexual, 3–20, rachilla disarticulating above glumes and between lemmas; lower glume absent on all but terminal spikelet, similar to upper glume, upper glume linear or oblong, strongly 3–9-nerved; lemmas elliptic to narrowly ovate, minutely 2-toothed, acute or awned, 5–9-nerved, awn subapical; paleas \pm subequal to lemmas, 2-keeled, keels \pm crested; stamens 3; styles very short, distinct, stigmas plumose. Caryopses elliptic-oblong to linear-oblong in outline, tightly enclosed by and adherent to lemma and palea.

12 species temperate Eurasia, introduced as pasture species elsewhere; 9 species naturalized Australia; 7 species south-eastern Queensland.

Identification of species can be difficult because many species hybridize freely.

1. Glumes $\frac{1}{4}$ – $\frac{3}{4}$ length of spikelets	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Glumes \pm equal to length of spikelets	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5
2. Lemmas unawned, or very rarely individuals with awns 0.5–1 mm long and then culms reddish around nodes	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
At least some lemmas on all spikelets with short or long awns	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
3. Lemmas unawned; culms greenish or straw coloured throughout	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1. <i>L. perenne</i>
Rarely some lemmas with awns 0.5–1 mm long; culms reddish at least around nodes	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2. <i>L. perenne</i> \times <i>L. rigidum</i>
4. Some lemmas shortly awned	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3. <i>L. \times hybridum</i>
All lemmas with awns	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4. <i>L. multiflorum</i>
5. Florets swollen at maturity	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5. <i>L. temulentum</i>
Florets not swollen at maturity	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6
6. Lemmas with awns less than 5 mm long, or unawned	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6. <i>L. rigidum</i>
Lemmas with awns more than 5 mm long	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7. <i>L. \times hubbardii</i>

1. **Lolium perenne* L.

PERENNIAL RYEGRASS

Lolium perenne var. *cristatum* Pers.

Tufted perennial 10–90 cm tall; culms greenish or straw coloured, erect or ascending. Leaf sheaths usually entire; ligules obtuse or truncate, up to 2 mm long; leaf blades linear, folded initially, \pm flat at maturity, linear attenuate, base with small auricles, 3–20 cm \times 0.2–0.6 cm, minutely scabrid on margin and on nerves. Spikes up to 30 cm long; spikelets 0.8–2 cm long, florets 4–14; upper glume \pm narrowly oblong, obtuse, 0.35–1.5 cm long, usually $\frac{1}{4}$ – $\frac{3}{4}$ length of spikelet, rarely almost as long as spikelet if spikelet small or underdeveloped; lemmas obtuse to blunt, all \pm similar though slightly decreasing in size upwards, overlapping, 3.5–7 mm long, often minutely scabrous along membranous margin and apex. **Fig. 18K.**

Native of Europe, widely cultivated and naturalized in temperate regions; naturalized mainly in the higher rainfall and cooler areas of the region, e.g. Toowoomba, Murgon areas, and Moreton district. Useful high quality winter grazing grass, but under certain growth conditions can be poisonous to stock.

2. **Lolium perenne* L. \times *L. rigidum* Gaudin

A RYEGRASS

Tufted annual up to 1.2 m tall; culms reddish at least around nodes, erect or ascending. Ligules obtuse to truncate, 1–1.5 mm long; leaf blades linear, folded initially, \pm flat at maturity, attenuate, base with small auricles, 5–24 cm \times 0.2–0.6 cm, minutely scabrid on margin and nerves. Spikes up to 25 cm long; spikelets 0.5–2 cm long, florets 3–13; upper glume \pm narrowly oblong, obtuse, 0.6–1.2 cm long, usually $\frac{1}{2}$ – $\frac{3}{4}$ length of spikelet; lemmas obtuse, acute or rarely with awn 0.5–1(–1.5) mm long, all \pm similar though decreasing in size upwards, overlapping, 4–8 mm long.

Recorded from higher altitude areas of the region, e.g. Beechmont, Wallangarra.

3. **Lolium* \times *hybridum* Hausskn.

A RYEGRASS

Tufted short-lived perennial up to 1.2 m tall; culms greenish to straw coloured, erect or ascending. Ligules obtuse, ca 1 mm long; leaf blades linear, \pm flat at maturity, attenuate, base auriculate, 5–30 cm \times 0.2–0.8 cm, minutely scabrid on margin and nerves. Spikes 10–30 cm long; spikelets 1–2.5 cm long, florets 6–14; glume narrowly oblong, obtuse, 5–10 mm long, $\frac{1}{4}$ – $\frac{3}{4}$ length of spikelet; lemmas obtuse, acute or some or most per spikelet with a subapical awn 1–4(–6) mm long, all \pm similar though decreasing in size upwards, overlapping, 4–7 mm long.

Recorded from the Moreton and Burnett districts, probably also other areas where both parents occur.

This is considered to be the hybrid *L. multiflorum* \times *L. perenne*.

4. **Lolium multiflorum* Lam. ITALIAN RYEGRASS; WESTERWOLDS RYEGRASS *Lolium italicum* A. Br.

Short-lived perennial up to 1.2 m tall; culms greenish to straw coloured, erect or ascending. Ligules obtuse or truncate, 1–2 mm long; leaf blades linear, initially inrolled,

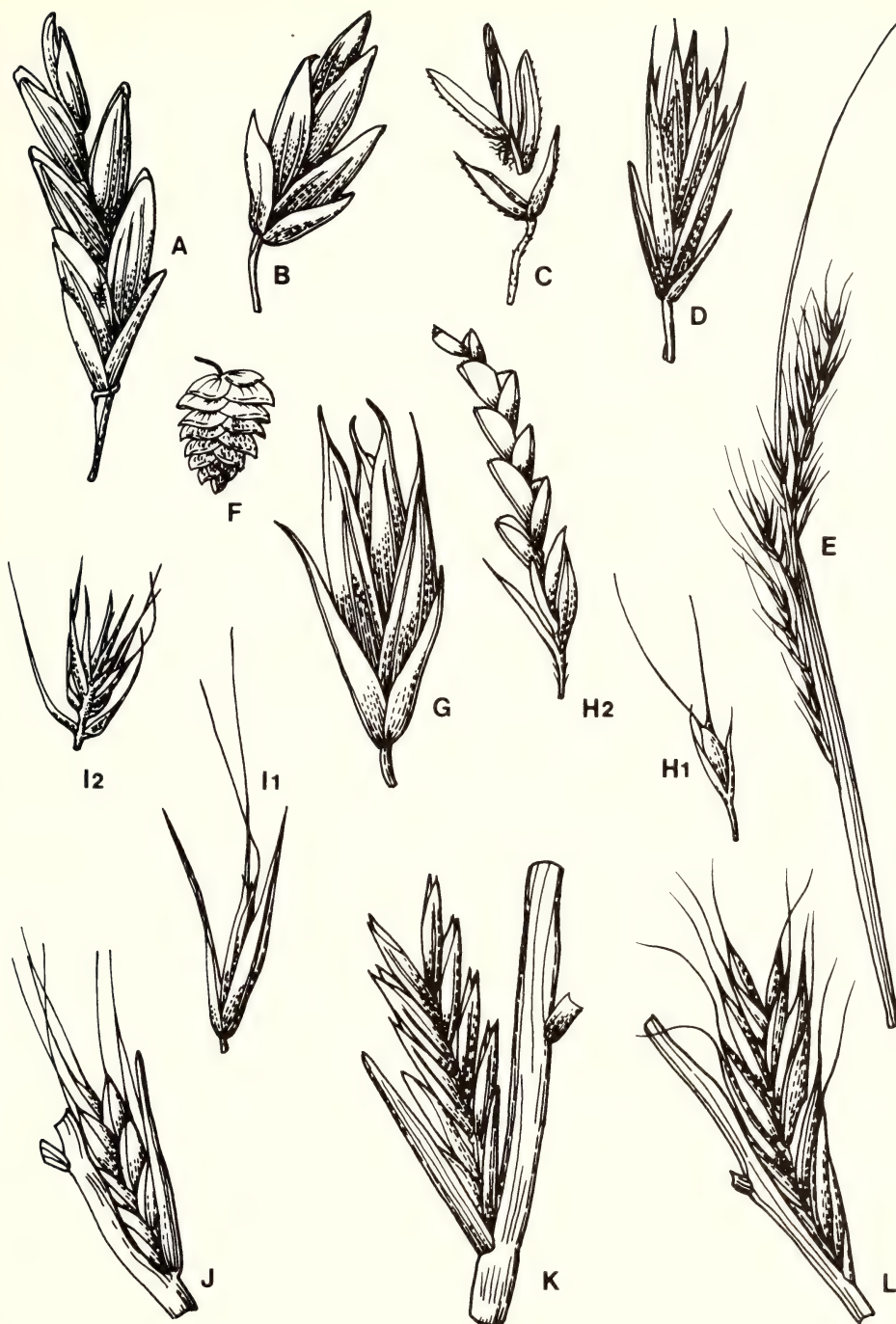


Fig. 18 POACEAE — A *Glyceria maxima*, spikelet x 6; B–C *Poa* spp. — B *P. annua*, spikelet x 6; C *P. labillardieri*, exploded view of spikelet showing copious web at base of lemma x 6; D *Festuca arundinacea*, spikelet x 3; E *Vulpia myuros*, inflorescence hardly exerted from leaf sheath x 1; F *Briza maxima*, spikelet x 1; G *Dactylis glomerata*, spikelet x 6; H₁–H₂ *Lamarckia aurea*, H₁ fertile spikelet x 6, H₂ sterile spikelet x 6; I₁–I₂ *Cynosurus echinatus*, I₁ fertile spikelet x 3, I₂ sterile spikelet x 6; J–L *Lolium* spp. — J *L. temulentum* var. *temulentum*, spikelet x 3; K *L. perenne*, spikelet x 3; L *L. multiflorum*, spikelet x 3.

± flat at maturity, attenuate, base auriculate, 5–30 cm × 0.1–1 cm, minutely scabrid along margins and nerves. Spikes 12–36 cm long; spikelets 0.8–2.5 cm long, florets 10–24; glume narrowly oblong, obtuse, 0.5–1.5 cm long, $\frac{1}{4}$ – $\frac{1}{2}$ length of spikelet when mature; lemmas blunt to acute, almost always with subapical awn (2–)5–8 mm long, all ± similar though slightly decreasing in size upwards, overlapping, 5–8 mm long. **Fig. 18L.**

Native of Europe; naturalized in higher rainfall areas of eastern parts of the region; not commonly collected.

5. **Lolium temulentum* L.

DARNEL; DRAKE

Annual up to 1.25 m tall; culms greenish or straw coloured, erect or ascending. Ligules truncate, 1–1.5 mm long; leaf blades linear, ± flat at maturity, attenuate, base auriculate, 4–30 cm × 0.3–1 cm, often minutely scabrous along nerves. Spikes 5–35 cm long, rachis often rigid, thick; spikelets 0.8–2.8 cm long, florets 4–14; glume ± narrowly oblong, obtuse, 0.6–2.5 cm long, $\frac{3}{4}$ to slightly longer than spikelets; lemmas blunt, unawned or awn 0.6–1.8 cm long, all ± similar though slightly decreasing in size upwards, overlapping, 4.5–6.5 mm long.

Two varieties occur in the region:

- | | | |
|---------------------|-----------|--|
| 1. Lemmas with awns | | <i>L. temulentum</i> var. |
| | | <i>temulentum</i> |
| Lemmas without awns | | <i>L. temulentum</i> var. <i>arvense</i> |

Both originating from the Middle East; *L. temulentum* var. *temulentum* (**Fig. 18J.**) has been recorded from the Darling Downs, Burnett and Moreton districts, while *L. temulentum* var. *arvense* (With.) Liljeblad (*L. arvense* With.) has been recorded from the Darling Downs and Moreton districts. Both are weeds primarily of the Australian Wheat Belt.

6. **Lolium rigidum* Gaudin

ANNUAL RYEGRASS; WIMMERA RYEGRASS

Annual up to 1.2 m tall; culms reddish even at maturity, erect or ascending. Ligules obtuse to truncate, 1–1.5 mm long; leaf blades linear, ± flat at maturity, attenuate, base auriculate, 4–20 cm × 0.2–0.8 cm, minutely scabrous on nerves. Spikes 3–30 cm long; spikelets 0.6–2 cm long, florets 3–13; glume ± narrowly oblong, obtuse, 0.6–2 cm long, $\frac{3}{4}$ to as long as spikelet; lemmas obtuse to blunt, unawned or rarely with awn up to 3 mm long, all ± similar though slightly decreasing in size upwards, overlapping, 4.5–7 mm long, often minutely scabrous along membranous margin and apex.

Native of Europe and the Mediterranean region; naturalized in Darling Downs, Moreton and Wide Bay districts, usually associated with cultivation. Can be poisonous to stock under certain conditions.

7. **Lolium* × *hubbardii* Jansen & Wachter ex B. Simon

A RYEGRASS

Annual up to 1.2 m tall; culms straw coloured to reddish at maturity, erect or ascending. Ligules obtuse, 1–2 mm long; leaf blades linear, ± flat at maturity, attenuate, with small basal auricles, 3–20 cm × 0.2–0.7 cm, usually minutely scabrid on margins and nerves. Spikes 5–30 cm long, spikelets 0.7–2.3 cm long, florets 4–16; glume ± narrowly oblong, obtuse, 0.6–1.5 cm long, $\frac{1}{2}$ to as long as spikelet; lemmas blunt, with awn 5–7.5 mm long, all ± similar though slightly decreasing in size upwards, overlapping, 4.5–6.5 mm long.

Recorded from Moreton, Wide Bay and Darling Downs districts, probably confined to the better rainfall areas.

This is a hybrid *L. multiflorum* × *L. rigidum*.

15. BROMUS L.

Annuals or perennials, tufted or ascending, occasionally rhizomatous. Ligules membranous; leaf blades rolled in bud, later flat, often lax. Inflorescences contracted or loose panicles of large spikelets; spikelets ± compressed laterally, rachilla disarticulating above glumes and between lemmas, florets several—many, uppermost often imperfect; glumes persistent, unequal, acute, lower 1–7-nerved, upper 3–9-nerved; lemmas usually 2-toothed apically, 5–11-nerved, awn if present arising from behind teeth or dorsally near tip; paleas usually shorter than lemmas, with 2 ciliate or scabrid keels; callus short;

stamens 3, rarely 2; ovary with terminal hairy appendage, stigmas plumose, laterally exerted. Caryopses linear to linear-obloid, dorsally compressed, usually adherent to palea and tightly enclosed in lemma.

50 species temperate and tropical mountains; *ca* 25 species Australia; 7 species south-eastern Queensland.

1. Lemmas with awns shorter than lemmas, or awns absent	2
Lemmas with awns longer than lemmas	4
2. Lemmas 0.8–1.9 cm long, 11-nerved, unawned or awn 0.5–3.5 mm long; ligules 4–5 mm long	1. <i>B. catharticus</i>
Lemmas 0.6–0.85 cm long, 7–9-nerved, awns 3–7 mm long; ligules 0.5–1.5 mm long	3
3. Glumes pubescent with long or short hairs; palea <i>ca</i> $\frac{3}{4}$ length of lemma	2. <i>B. hordeaceus</i>
Glumes glabrous or occasionally puberulent with short hairs, palea almost as long as lemma	3. <i>B. × pseudothominii</i>
4. Lemmas 2.2–3.2 cm long, awn 3.5–6 cm long; palea <i>ca</i> $\frac{2}{3}$ as long as lemma	4. <i>B. diandrus</i>
Lemmas 1.1–2.2 cm long, awn 1.2–2.5 (–4) cm long; palea <i>ca</i> $\frac{3}{4}$ length of lemma, rarely $\frac{2}{3}$ as long	5
5. Inflorescences loose panicles up to 15 cm long; upper glume 5-nerved, 0.7–1.3 cm long	5. <i>B. arenarius</i>
Inflorescences \pm compact erect panicles 2–12 cm long; upper glume 3-nerved, or if 5-nerved then 1.2–2.4 cm long	6
6. Panicles 6–12 cm long; culms glabrous to puberulent below inflorescence; paleas $\frac{2}{3}$ to $\frac{3}{4}$ length of lemmas	6. <i>B. madritensis</i>
Panicles 2–7 cm long (mostly less than 5 cm); culms pubescent to puberulent below inflorescence; paleas at least $\frac{3}{4}$ length of lemmas	7. <i>B. rubens</i>

1. ****Bromus catharticus* Vahl**

PRAIRIE GRASS

Bromus unioloides Kunth; *B. willdenowii* Kunth; *Ceratochloa unioloides* (Kunth) Beauv. Tufted often robust annual up to 1 m tall; culms erect or spreading. Leaf sheaths villous to puberulent; ligules obtuse, often laciniate, puberulent, 4–5 mm long; leaf blades linear, flat, linear, attenuate, up to 30 cm \times 0.8 cm, puberulent on upper surface, minutely scabrous along nerves and margin. Inflorescences large loose panicles up to 30 cm long, primary branches whorled; spikelets 1.5–3.5 cm long, florets 6–12; glumes unequal, lower 0.6–1.3 cm long, 7-nerved, upper 0.7–1.6 cm long, 9-nerved, both strongly keeled, scabrous along keels; lemmas keeled, overlapping when young, later \pm spreading, 0.8–1.9 cm long, 11-nerved, unawned or awn 0.5–3.5 mm long; palea *ca* $\frac{2}{3}$ as long as lemma. **Fig. 19A.**

Native of South America, now widespread in temperate regions; naturalized through most of the region, often a weed. Useful winter pasture grass, but has been recorded with potentially toxic levels of nitrates.

2. ****Bromus hordeaceus* L.**

SOFT BROME

Serrafalcus hordeaceus (L.) Green & Godr.; *Bromus mollis* L.; *B. mollis* var. *glabratus* Druce; *S. mollis* (L.) Parl. Tufted annual 10–75 cm tall; culms geniculate, then erect. Leaf sheaths villous; ligules obtuse to laciniate, 0.5–1.5 mm long, sometimes pubescent; leaf blades linear, attenuate, up to 25 cm \times 0.7 cm, puberulent. Inflorescences erect \pm compact panicles 2–15 cm long; spikelets 1–2 cm long, florets 5–13; glumes acute, unequal, lower 4.5–7 mm long, 3–5-nerved, upper 5.5–8 mm long, 7-nerved, both keeled, pubescent with long or short hairs; lemmas keeled, overlapping when young, later somewhat spreading, 6–8.5 mm long, 7–9-nerved, pubescent or puberulent, awn subapical, shorter than lemma, 3–7 mm long; palea *ca* $\frac{3}{4}$ length of lemma.

Native of Mediterranean region; naturalized in the Darling Downs and Moreton districts, often in disturbed areas or improved pasture.

3. **Bromus* × *pseudothominii* P. Smith*Bromus thominii* auct. non Hardouin, Tutin

Tufted annual up to 60 cm tall; culms ascending, sometimes geniculate. Leaf sheaths villous-puberulent; ligules obtuse to slightly laciniate, 0.5–1 mm long; leaf blades linear, attenuate, up to *ca* 15 cm × 0.4 cm, puberulent to villous-puberulent. Inflorescences slender panicles 3–9 cm long; spikelets 1–1.5 cm long, excluding awns, florets 6–8; glumes acute, unequal to subequal, lower 4.5–6 mm long, 5-nerved, upper 6–7.5 mm long, 7-nerved, both keeled, glabrous to shortly puberulent; lemmas keeled, overlapping when young, later only slightly spreading, 6.5–8 mm long, 7-nerved, glabrous or shortly puberulent, awn subapical, shorter than lemma, 3–7 mm long; palea $\frac{7}{8}$ to almost as long as lemma.

Native of Europe; recorded from Darling Downs and Moreton districts; very rarely collected.

4. **Bromus diandrus* Roth**GREAT BROME**

Bromus gussonii Parl.; *B. rigidus* auct. non Roth; *B. sterilis* auct. non L.; *B. maximus* auct. non Desf. nec Gileb.

Tufted, often robust annual up to *ca* 90 cm tall; culms geniculate, ascending. Leaf sheaths villous-puberulent; ligules obtuse to laciniate, 1–5 mm long; leaf blades linear, attenuate, up to 33 cm × 1 cm, villous-puberulent. Inflorescences loose panicles 6–12 cm long, primary branches whorled; spikelets 3–6 cm long, excluding awns, florets *ca* 6–14; glumes acute, unequal, lower 1.2–2.4 cm long, 1–3-nerved, upper 2–3 cm long, 3–5-nerved, both keeled, often scabrous along keels; lemmas keeled, overlapping when young, later ± spreading, 2.2–3.2 cm long, 7-nerved, ± scabrous, awn subapical, 3.5–6 cm long, longer than lemma; palea *ca* $\frac{2}{3}$ length of lemma.

Native of Mediterranean region; naturalized in the Darling Downs, Moreton and Burnett districts, often near cultivation or disturbed sites. Little fodder value; the spikelets can be troublesome to sheep.

5. *Bromus arenarius* Labill.**SAND BROME***Serrafalcus arenarius* (Labill.) C. A. Gardner

Tufted annual 30–40 cm tall; culms erect or ascending. Leaf sheaths villous; ligules laciniate, 1–5 mm long; leaf blades linear, flat, attenuate, up to 20 cm × 0.5 cm, villous to glabrescent. Inflorescences loose panicles up to 15 cm long, lowest primary branches whorled; spikelets 1.5–3.5 cm long, florets 5–12; glumes acute to mucronate, unequal, lower 5–10 mm long, 3-nerved, upper 0.7–1.3 cm long, 5-nerved, both keeled, puberulent, or rarely ± glabrous; lemmas keeled, overlapping when young, sometimes spreading at maturity, 1–1.5 cm long, 7-nerved, villous-pubescent or rarely scabrous or glabrescent, awn subapical, 1.1–2.5 cm long, as long as or mostly longer than lemma; palea *ca* $\frac{3}{4}$ length of lemma.

Recorded from southern Darling Downs district.

6. **Bromus madritensis* L.**MADRID BROME; LESSER BROME**

Tufted annual 15–75 cm tall, culms geniculate, then erect. Leaf sheaths villous-puberulent to glabrescent; ligules laciniate, 1–2.5 mm long; leaf blades linear, attenuate, up to 22 cm × 0.5 cm, puberulent. Inflorescences ± compact erect panicles 6–12 cm long, culms glabrous to puberulent below inflorescences; spikelets 1.8–4.2 cm long, excluding awns, florets 4–9; glumes acute to acuminate, unequal, lower 0.8–1.5 cm long, 1–3-nerved, upper 1.2–2.4 cm long, 3–5-nerved, both keeled, puberulent to ± glabrous or scabrous; lemmas keeled, overlapping when young, later somewhat spreading, 1.2–2.2 cm long, 5–7-nerved, puberulent to ± glabrous or scabrous, awn subapical, longer than lemma, 1.3–4 cm long; palea *ca* $\frac{2}{3}$ – $\frac{3}{4}$ length of lemma. **Fig. 19B.**

Native of Mediterranean region; recorded from the Moreton district in sandy soil; very rarely collected.

7. **Bromus rubens* L.**RED BROME**

Tufted annual 10–50 cm tall; culms geniculate, erect. Leaf sheaths villous-puberulent; ligules laciniate, 1–3 mm long; leaf blades linear or linear-triangular, flat, attenuate, up to 27 cm × 0.5 cm, puberulent to pubescent. Inflorescences compact erect panicles 2–7 cm long, culms puberulent to pubescent below inflorescences; spikelets 1–2.6 cm long, excluding awns, florets 3–8; glumes acute to acuminate, unequal, lower 0.7–1.3 cm long,

1-nerved, upper 0.9–1.8 cm long, 3-nerved, both keeled, glabrous or puberulent; lemmas keeled, overlapping when young, later somewhat spreading, 1.1–1.7 cm long, 5-nerved, glabrous or puberulent, awn subapical, as long as or longer than lemma, 1.1–2(–3) cm long; palea at least $\frac{3}{4}$ length of lemma.

Native of Mediterranean region; recorded from the Darling Downs district; very rarely collected.

16. AVENA L.

Tufted often robust annuals. Ligules membranous; leaf blades linear, rolled in bud, later flat. Inflorescences panicles, usually open; spikelets solitary, pedicellate, pendulous, large, rachilla disarticulating above glumes and between lemmas, or in cultivated forms not articulate between lemmas, florets 1–3, rarely more, bisexual or uppermost male; glumes persistent, \pm equal, margin scarious, acute, rounded on back, 7–11-nerved; lemmas stiff, acute, shorter than glumes, with 2 bristles or teeth from apex, 5–9-nerved, awn attached about middle of back of lemma, usually geniculate, twisted below knee, awn sometimes absent; paleas shorter than lemmas, 2-keeled, 2-toothed; stamens 3; ovary densely villous from base upwards, styles free, very short or absent, stigmas plumose. Caryopses oblong to elliptic in outline, subterete, grooved in front, tightly embraced by hardened lemma and palea.

70 species temperate regions and mountains of tropics; 8 species naturalized or cultivated Australia; 3 species south-eastern Queensland.

- | | | |
|--|---|---|
| 1. Lemmas glabrous or with 1–few hairs at base and sides; spikelet axes not disarticulating even between glumes and lemmas | 1. <i>A. sativa</i> | |
| At least lowest 2 lemmas conspicuously villous pubescent over lower half; spikelet axes variously disarticulating | | 2 |
| 2. Spikelet axes readily disarticulating between lemmas at maturity | 2. <i>A. fatua</i> | |
| Spikelet axes tough and continuous between lemmas at maturity | 3. <i>A. sterilis</i> subsp. <i>ludoviciana</i> | |

1. **Avena sativa* L.

COMMON OAT(S)

Robust annual; culms erect or basally geniculate. Ligules obtuse to blunt, margin irregular or dentate, 3–8 mm long; leaf blades linear, attenuate, up to 45 cm \times 1.5 cm, minutely scabrous on margin and nerves. Panicles loose, 10–50 cm long; spikelet axis not disarticulating between glumes and lowest floret at maturity; glumes equal or lower slightly shorter than upper, acute to acuminate, lower 1.5–3 cm long, upper 1.6–3.6 cm long, glabrous; lemma with acute to long acuminate teeth, (1.1–)1.4–2.2 cm long, glabrous or rarely somewhat scabrous towards apex or with few long hairs at base, awn absent or 1.6–4.5 cm long, often almost straight and only slightly twisted.

Native of Europe and central and western Asia; naturalized in the region near where oat crops are grown. Under certain conditions can be poisonous to stock.

This species has been recorded as hybridizing with *A. fatua* L. See note under that species.

2. **Avena fatua* L.

WILD OAT(S)

Robust annual; culms erect or basally geniculate. Ligules obtuse to acute, margin irregularly dentate to lacerate, up to 8 mm long; leaf blades linear, attenuate, up to 45 cm \times 1.5 cm, occasionally with long scattered hairs, minutely scabrous on margin and nerves. Panicles loose, 10–40 cm long; spikelet axis disarticulating readily between glumes and each lemma at maturity; glumes acute, slightly unequal, lower slightly shorter than upper, lower 1.6–2.7 cm long, upper 1.8–3 cm long, glabrous; lemma with acute teeth, 1.5–2 cm long, verrucose and villous-puberulent at least in lower half, awn 1.8–4.4 cm long, geniculate and twisted. **Fig. 19C.**

Native of Europe and western and central Asia; naturalized in most districts of the region, a serious weed in cereal crops due to the ability of the spikelet axis to disarticulate ("shatter") at maturity.

This species and *A. sativa* L. have been known to hybridize. The hybrid can be distinguished by the spikelet axis not disarticulating between the glumes and lower floret at maturity, yet the lemma is villous puberulent at least in the lower half.

3. **Avena sterilis* L. subsp. **ludoviciana** (Durieu) C. C. Gillet & Magne LUDO WILD
OAT(S)

Avena ludoviciana Durieu; *A. persica* Steudel

Usually erect robust annual. Ligules obtuse to acute, margin irregularly dentate, 0.5–8 mm long; leaf blades linear, attenuate, up to 40 cm × 1.2 cm, occasionally with scattered long hairs, minutely scabrous on margin and nerves. Panicles loose, 10–30 cm long; spikelet axis disarticulating at maturity between glumes and lowest lemma only; glumes subequal, acute, lower glume 1.4–3 cm long, upper glume 1.4–3.2 cm long, glabrous; lemma with acute to acuminate teeth, (1–)1.3–2.5 cm long, verrucose, villous-puberulent at least in lower half, awn 1.7–5.7 cm long, geniculate and very twisted.

Native of Europe and western Asia; naturalized in the Moreton, Darling Downs and Burnett districts, a weed in cereal crops or waste places.

17. TRISETUM Pers.

Loosely tufted annuals or perennials up to 80 cm tall; culms erect, slender. Ligules membranous; leaf blades mostly basal, flat. Inflorescences of contracted and spike-like or somewhat loose panicles, erect or nodding, branches slender; spikelets pedicellate, rachilla breaking up at maturity beneath each lemma, rachilla pubescent, produced above upper floret, florets 2–4; glumes unequal, acute, keeled, rough on keels, lower glume 1-nerved, upper 3-nerved; lemmas smooth, with 2 fine short teeth at apex, finely 3–5-nerved, awn arising from near middle of back, bent below middle or curved; paleas silvery, subequal to lemmas, 2-keeled, 2-toothed, not enclosed by lemma at maturity; callus pubescent. Caryopses 2–4 mm long, with fairly long apical appendage.

75 species North and South temperate; 2 species Australia; 1 species south-eastern Queensland.

1. *Trisetum spicatum* (L.) Richter subsp. **australiense** Hulten BRISTLE GRASS
Slender tufted or occasionally stoloniferous perennial up to ca 50 cm tall; culms pubescent to ± glabrous. Ligules lacinate, acute, up to ca 2 mm long; leaf blades linear, attenuate, 5–20(–30) cm × 0.1–0.5 cm, puberulent or glabrous, minutely scabrous along margins. Panicles spike-like; spikelets 6–9 mm long, florets 2 or 3; glumes acuminate, both glabrous, lower slightly shorter than upper, 4–5 mm long, upper 5–7 mm long; lemmas membranous, 5–7 mm long, minutely scabrid, awn curved, 4–8.5 mm long. **Fig. 19D.**

Cosmopolitan species; recorded from above 1000 m altitude on McPherson Ra. and Mt Cordeaux on Great Dividing Ra. on cliff edges or rocky places; commoner in alpine areas of Australia.

18. ROSTRARIA Trin.

Annuals; culms erect, glabrous or pilose below nodes. Ligules membranous; leaf blades linear, usually pubescent. Inflorescences compressed, usually spicate panicles; spikelets with rachilla disarticulating beneath each lemma, florets 2–7, bisexual; lower glume 1–3-nerved, upper 3–5-nerved; lemmas keeled, 5-nerved, awn arising from near apex; paleas at least $\frac{2}{3}$ length of lemmas, membranous, scabrous along keels; callus short; stamens 3; ovary glabrous. Caryopses ca 2 mm long with small apical appendage.

About 15 species from Mediterranean region to central Asia, also South America; 2 species naturalized Australia; 1 species south-eastern Queensland.

1. **Rostraria cristata* (L.) Tzvelev ANNUAL CAT'S TAIL
Festuca cristata L.; *Koeleria phleoides* (Vill.) Pers.; *Lophochloa phleoides* (Vill.) Reichenb.; *Trisetum phleoides* (Vill.) Trin.; *L. cristata* (L.) Hylander
Erect annual 10–40 cm tall. Leaves mostly basal; ligules obtuse or lacinate, often margin ciliate, up to 2 mm long; leaf blades attenuate, up to 12 cm × 0.3 cm, glabrous or

puberulent. Panicles dense, spike-like, 2–7 cm long; spikelets 2–4 mm long, laterally compressed; glumes acute, sparsely pubescent, lower 1.5–2 mm long, 1-nerved, upper 2–3 mm long, 3-nerved; lemmas acute, 2–3 mm long, 5-nerved, often scabrous along nerves, puberulent, awn arising from just below apex, 0.5–1 mm long; palea $\frac{2}{3}$ – $\frac{3}{4}$ length of lemma, very narrow. **Fig. 19E.**

Native of Europe and western and central Asia; recorded from the Darling Downs district in granite derived soils.

19. AIRA L.

Small delicate annuals. Ligules membranous; leaf blades often convolute, narrow. Inflorescences of open or sometimes contracted panicles, branches very slender; spikelets small, rachilla disarticulating above glumes and between lemmas, laterally compressed, minutely produced beyond upper floret, florets 2, bisexual; glumes subequal, keeled, 1–3-nerved; lemmas acute with 2 slender teeth, rounded on back, obscurely 2–5-nerved, dorsally awned from below middle or unawned; paleas slightly shorter than lemmas, narrow, 2-toothed; callus minute, obtuse; stamens 3; ovary glabrous, stigmas 2. Caryopses narrow, \pm adherent to lemma and palea.

12 species north and south temperate regions, mountains of tropics, South Africa, Mauritius; 5 species Australia; 2 species south-eastern Queensland.

- | | |
|--|---------------------------|
| 1. Glumes 2–2.5 mm long; lemma of lower floret usually awnless | 1. <i>A. cupaniana</i> |
| Glumes 2.5–3.2 mm long; lemma of lower floret awned | 2. <i>A. caryophyllea</i> |

1. **Aira cupaniana* Guss.

SILVERY HAIRGRASS

Erect annual up to 45 cm tall; culms solitary or tufted. Ligules acute, 3–6 mm long; leaf blades linear, acute, up to 10 cm long, minutely scabrous on margin and nerves. Panicles open, up to 12 cm long; glumes acute, 1.75–2.5 mm long, 1-nerved, minutely scabrous along margin and irregularly along keel; lemmas acuminate, 1–2 mm long, minutely scabrid, lower slightly shorter than upper and usually awnless, awn of upper geniculate, 2.2–3.2 mm long.

Native of Mediterranean region; naturalized in southern Darling Downs district on granite derived soils. A winter growing grass, occasionally a weed of the environs of Brisbane.

2. **Aira caryophyllea* L.

SILVERY HAIRGRASS

Erect annual up to 45 cm tall; culms solitary or tufted. Ligules acute, 2–6 mm long; leaf blades linear, acute, up to ca 10 cm long, minutely scabrous along margin and nerves. Panicles open, up to ca 12 cm long; glumes acute, 2.6–3.5 mm long, 1-nerved, minutely scabrous along margin and irregularly along keel; lemmas acuminate, \pm equal, 1.5–2.5 mm long, minutely scabrid, both awned, awn geniculate, 3–4 mm long. **Fig. 19F.**

Native of Europe, America; recorded from the southernmost parts of the Darling Downs district; rarely collected. A winter growing grass.

20. HOLCUS L.

Annuals or perennials. Ligules membranous; leaf blades flat. Inflorescences of soft usually dense contracted panicles; spikelets solitary, laterally compressed, usually falling entire, florets 1 or mostly 2, lower bisexual, upper male; glumes membranous, keeled, lower shorter than upper; lemmas shorter than glumes, obscurely 3–5-nerved; paleas slightly shorter than lemmas, apex minutely hairy, 2-keeled; stamens 3; ovary glabrous, styles free, stigmas plumose. Caryopses laterally compressed, embraced by lemma and palea, often adherent to palea, soft.

8 species, Canary Is, Africa, Europe to western Asia; 4 species naturalized Australia; 1 species south-eastern Queensland.

1. **Holcus lanatus* L.

YORKSHIRE FOG

Tufted pubescent perennial up to 1 m tall; culms erect or ascending. Ligules \pm truncate,

1–2 mm long, pubescent, ciliate at apex; leaf blades linear-triangular, attenuate, up to 20 cm × 1 cm, softly pubescent. Panicles dense, up to 20 cm long, branches pubescent; glumes acute, pubescent, 3–4.5 mm long, lower slightly shorter than upper, 1-nerved, upper sometimes aristate, 3-nerved; lemmas blunt, 2–2.5 mm long, 3-nerved, ciliate along keel and on margin towards apex, otherwise smooth, shining, lower lemma awnless, upper with curved awn *ca* 1.5 mm long, arising above middle. **Fig. 19G.**

Native of Europe, western Asia and northern Africa; naturalized mainly in eastern Darling Downs district but also in the Moreton and Wide Bay districts, often in swampy areas or seasonally moist heavy soils.

21. *ARRHENATHERUM* Beauv.

Tall slender perennials. Ligules membranous; leaf blades linear. Inflorescences of lax elongated panicles; spikelets solitary, laterally compressed, rachilla disarticulating above glumes, usually not between lemmas, florets 2, lower male, upper bisexual; glumes unequal, lower much shorter than upper, 5–7-nerved; lemmas acuminate, 5–7-nerved, lower awned from near base, upper awnless, awn geniculate and twisted; paleas shorter than lemmas, 2-keeled, keels ciliate; callus glabrous; stamens 3; ovary densely villous towards apex, styles free, stigmas plumose. Caryopses obloid, pubescent or villous at summit.

6 species Europe and Mediterranean; 1 species Australia, a variety of which occurs in south-eastern Queensland.

1. **Arrhenatherum elatius* (L.) Beauv. ex J. & C. Presl var. *bulbosum* (Willd.) Spenner BULBOUS OATGRASS; ONION TWITCH

Avena bulbosa Willd.

Loosely tufted perennial up to 1 m tall, culms arising from bulbous rhizomatous base. Ligules obtuse to truncate, apex irregular, 1–2 mm long; leaf blades attenuate, up to 40 cm × 0.6 cm, sparsely pubescent and minutely scabrous on margin and nerves towards apex. Panicles narrow, up to 40 cm long; glumes unequal, acute, ± glabrous, lower 4.5–7.5 mm long, 1-nerved, upper 8–10 mm long, 3-nerved; lemmas acuminate, 8.5–10 mm long, sparsely pubescent towards base, or glabrescent, 7-nerved, lower with awn 1.3–1.8 cm long, upper unawned. **Fig. 19H.**

Native of Europe and Mediterranean region; recorded from the Moreton and Wide Bay districts in mountainous areas, e.g. Tamborine Mtn, Maleny, where pastures have been developed.

22. *HIEROCHLOE* R. Br.

Tufted or rhizomatous slender perennials, sweetly scented with coumarin. Ligules membranous; leaf blades flat. Inflorescences of loose panicles, branches spreading; spikelets laterally compressed, rachilla disarticulating above glumes, florets falling together, florets 3, lower 2 male, uppermost bisexual; glumes ± equal, keeled, 1–3-nerved; lemmas shorter than or ± as long as glumes, male lemmas broadly elliptic, sometimes shortly awned, bisexual lemma awnless, 3–5-nerved; paleas all shorter and narrower than lemmas, males 2-keeled, bisexual 1-keeled; stamens 3; styles 2, stigmas plumose. Caryopses ovoid, compressed, enclosed by lemma and palea.

30 species, cool temperate to Arctic and Antarctic regions, and mountainous areas; 4 species Australia; 1 species south-eastern Queensland.

1. *Hierochloe rariflora* J. D. Hook.

SCENTED HOLYGRASS

Glabrous perennial; culms erect or ± prostrate, wiry, slender. Ligules truncate or obtuse, minutely ciliate at apex, *ca* 1 mm long; leaf blades linear, attenuate, up to 20 cm × 0.6 cm, minutely scabrous. Panicles mostly 4–6 cm, rarely –13 cm long, branches capillary; glumes broad, obtuse to acute, 3-nerved, lower shorter than upper, 2–3 mm long, upper 3–3.5 mm long, ± glabrous; lemmas obtuse, ciliate on margin, 3.5–5 mm long, 5-nerved, minutely scabrous at least on upper half. **Fig. 19I.**

Recorded from the Lamington Plateau on the McPherson Ra.



Fig. 19 POACEAE — A–B *Bromus* spp. — A *B. catharticus*, spikelet x 1; B₁–B₂ *B. madritensis*, B₁ inflorescence x 1; B₂ spikelet x 1; C *Avena fatua*, spikelet x 1; D *Trisetum spicatum* subsp. *australiense*, spikelet x 3; E₁–E₂ *Rostraria cristata*, E₁ inflorescence x 1; E₂ spikelet x 6; F *Aira caryophyllea*, spikelet x 6; G *Holcus lanatus*, spikelet x 6; H₁–H₂ *Arrhenatherum elatius* var. *bulbosum*, H₁ bulbous base x 1, H₂ spikelet x 3; I *Hierochloe rariflora*, spikelet x 6; J *Anthoxanthum odoratum*, spikelet x 6.

23. ANTHOXANTHUM L.

Annuals or perennials, fragrant with coumarin. Ligules membranous; leaf blades flat, \pm flaccid. Inflorescences of spike-like or narrow panicles; spikelets slightly laterally compressed, rachilla disarticulating above glumes only, florets 3, lower 2 neuter or (not in Australia) male, upper bisexual; glumes keeled, 1-3-nerved, upper glume longer than lower; lower sterile lemmas equal, similar, keeled, strongly laterally compressed, 5-7-nerved, both awned, paleas usually absent, upper lemma smaller than others, delicately 7-1-nerved, palea 1-nerved; stamens 2 in bisexual floret, absent in rest (or 3 in male florets); styles distinct, long, stigmas plumose. Caryopses ovoid, slightly laterally compressed.

20 species northern temperate and tropical mountains of Africa, Asia; 2 species naturalized Australia; 1 species south-eastern Queensland.

1. **Anthoxanthum odoratum* L.

SWEET VERNAL GRASS

Tufted perennial up to 1 m tall; culms erect or somewhat spreading; slender, rather stiff. Ligules obtuse, 1-5 mm long; leaf blades linear, attenuate, usually up to 12 cm \times 0.5 cm, rarely larger, puberulent to glabrous, scabrous to smooth. Panicles spike-like, up to 12 cm long, branches short; glumes ovate, acuminate, lower 3-5 mm long, 1-nerved, upper 5.5-8 mm long, 3-nerved, puberulent to \pm glabrous; sterile lemmas obtusely 2-lobed at apex, 2.5-3.5 mm long, 4-5-nerved, pilose, lower awned from above middle of back, awn straight, 2-4 mm long, upper awned from well below middle of back, awn bent, twisted below bend, 6-8 mm long, terminal bisexual floret with rounded lemma 2 mm long, awnless. **Fig. 19J.**

Native of Europe and temperate Asia; naturalized in southern Darling Downs district on granite derived soils. Has been used in seed mixtures for pastures but it has been found to be not very palatable to stock and of inferior nutritive value.

24. DEYEUXIA Clarion ex Beauv.

Erect tufted perennials, often tall. Ligules membranous; leaf blades flat or convolute. Inflorescences terminal contracted or \pm open panicles; spikelets solitary, laterally compressed, rachilla disarticulating above glumes only, sometimes produced as a bristle beyond floret, florets 1, bisexual, rarely 2; glumes acute, subequal, keeled, 1-nerved, unawned; lemma entire or toothed apically, 3-5-nerved, awned or not; palea as long as lemma, 2-nerved, 2-keeled; callus often pubescent; stamens 3; ovary glabrous, styles short, free, stigmas plumose. Caryopses subterete, free from but enclosed in lemma and palea.

200 species temperate; 27-32 species Australia; 5 species south-eastern Queensland.

Species of *Deyeuxia* are generally called BENT GRASS.

- | | | |
|---|------------------------|---|
| 1. Lemmas <i>ca</i> 3 mm long; awns geniculate, 1.75-3.5 mm long | 1. <i>D. rodwayi</i> | |
| Lemmas up to 2.5 mm long; awns straight, less than 1 mm long, or so minute as to be apparently absent | | 2 |
| 2. Panicles dense, spike-like; glumes 2.5 mm long or longer | 2. <i>D. imbricata</i> | |
| Panicles loose or branches spreading; glumes up to 2.5 mm long | | 3 |
| 3. Panicles erect, branches rather rigid, rather spreading; lemmas up to 1.75 mm long, smooth | 3. <i>D. gunniana</i> | |
| Panicles loose, laxly spreading, branches filiform; lemmas 1.75-2.5 mm long, minutely scabrid | | 4 |
| 4. Lemmas smooth or slightly minutely scabrid, with prominent nerves | 4. <i>D. decipiens</i> | |
| Lemmas distinctly and densely minutely scabrid, nerves obscure | 5. <i>D. parviseta</i> | |

1. *Deyeuxia rodwayi* Vickery

Very slender perennial 15-40 cm tall; culms erect or ascending. Ligule truncate, lacinate, 2-3 mm long, scabrous to pubescent; leaf blades linear, attenuate, up to 10 cm \times 0.3 cm, minutely scabrous to pubescent. Panicles contracted or slightly spreading, up to 11 cm long, not dense; spikelets 3.5-4.2 mm long, laterally compressed; glumes acute, 1-nerved,

only slightly unequal, lower 3.5–3.75 mm long, upper 3–4 mm long, keels scabrid; lemma narrowly truncate and obscurely toothed, *ca* 3 mm long, 4-nerved above middle, minutely scabrid, awned from *ca* middle, awn geniculate, 1.75–3.5 mm long.

Recorded from McPherson Ra.

Specimens with slightly larger glumes and lemmas have been recorded from the southern states.

2. *Deyeuxia imbricata* Vickery

Tufted perennial 0.8–1.1 m tall; culms erect, slender to rather stout. Ligules truncate, jagged, laciniate, 3–6 mm long, finely pubescent; leaf blades linear, attenuate, up to 30 cm × 0.5 cm, minutely scabrous. Panicles very dense, spike-like, up to 15 cm long; spikelets 2–3.5 mm long, laterally compressed; glumes acute, 1-nerved, subequal, lower 2.5–3.2 mm long, upper 2.5–3.5 mm long, scabrid on keels, minutely scabrid on sides; lemma truncate and minutely 4-toothed, 2–2.5 mm long, 5-nerved, minutely scabrid, awned from above middle, awn 0.5–1 mm long.

Recorded from Stanthorpe area and near Mundubbera.

3. *Deyeuxia gunniana* (Nees) Benth.

Echinopogon gunniana Nees; *Agrostis gunniana* (Nees) F. Muell.; *Deyeuxia breviglumis* Benth.; *A. breviglumis* (Benth.) F. Muell.; *Calamagrostis breviglumis* (Benth.) Maiden & Betche

Very slender tufted glabrous ?perennial 7–35 cm tall; culms erect or ascending. Ligules obtuse or truncate, up to 1 mm long; leaf blades filiform, up to 15 cm × 0.1 cm, smooth or minutely scabrous. Panicles erect, 2–9 cm long, branches short, rather rigid, spreading; spikelets 1.7–2 mm long, slightly laterally compressed; glumes acute to obtuse, 1-nerved, subequal with lower slightly shorter than upper, 0.8–1.5 mm long, minutely scabrid on keels; lemma truncate, 1.5–1.75 mm long, 3–5-nerved, smooth, awned from just below apex, awn 0.5–0.9 mm long. **Fig. 20A.**

Recorded from Girraween National Park, in southernmost Darling Downs district.

4. *Deyeuxia decipiens* (R. Br.) Vickery

Agrostis decipiens R. Br.; *Vilfa decipiens* (R. Br.) Beauv.; *Cinna decipiens* (R. Br.) Kunth

Tufted glabrous perennial 0.45–1 m tall; culms erect, slender to rather stout. Ligules obtuse or truncate, laciniate, 2–4 mm long; leaf blades usually convolute when dry, acuminate, up to 30 cm × 0.4 cm, only slightly minutely scabrous. Panicles loose, somewhat spreading, up to 30 cm long, branches filiform; spikelets 2–3 mm long, somewhat laterally compressed; glumes acute, 1-nerved, subequal, lower 1.5–2.25 mm long, upper 2–2.5 mm long, smooth or scabrid along keel and minutely scabrid on sides; lemma narrowly truncate, 2–2.25 mm long, 5-nerved, minutely scabrid, awned from just below apex, awn 0.2–0.3 mm long. **Fig. 20B.**

Recorded from Girraween National Park, in southernmost Darling Downs district.

5. *Deyeuxia parviseta* Vickery

Loosely tufted perennial 0.6–1.2 m tall; culms erect or ascending. Ligules truncate, jagged, 1–4 mm long, minutely scabrid; leaf blades linear, attenuate, flat, up to 25 cm × 0.4 cm, minutely scabrous on nerves and margins. Panicles loose and laxly spreading, 12–20 cm long, spikelets *ca* 2.5 mm long; glumes acute, 1-nerved, scabrid along keel, unequal, lower 1–2 mm long, upper 1.5–2.25 mm long; lemma truncate, 1.75–2.5 mm long, 5-nerved, minutely scabrid, apparently unawned or awned from just below apex, less than 0.5 mm long.

Recorded from McPherson Ra. and Stanthorpe area.

25. AGROSTIS L.

Tufted, rhizomatous or sometimes stoloniferous annuals or perennials. Ligules membranous; leaf blades usually flat. Inflorescences of open or contracted branched panicles; spikelets solitary, pedicellate, rachilla disarticulating above or below glumes, sometimes extended, florets 1, bisexual; glumes \pm equal, keeled, awnless, 1-nerved; lemma shorter than or equalling glumes, awned or not, 3-5-nerved; palea shorter than lemma, 2-nerved or nerveless, thin, usually small, sometimes absent; callus very small, often bearded; stamens 3; ovary glabrous, styles distinct, stigmas plumose. Caryopses oblong in outline, \pm compressed or subterete, grooved in front.

150-200 species cosmopolitan, chiefly northern temperate; 20 species Australia; 5 species south-eastern Queensland.

- | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|--------------------------|---|
| 1. Lemmas distinctly awned | . | . | . | . | . | . | . | . | . | 2 |
| Lemmas awnless | . | . | . | . | . | . | . | . | . | 3 |
| 2. Glumes 2-3.5 mm long | . | . | . | . | . | . | . | . | 1. <i>A. avenacea</i> | |
| Glumes 3.5-5 mm long | . | . | . | . | . | . | . | . | 2. <i>A. aemula</i> | |
| 3. Panicles diffuse, broad with long capillary branches; palea absent or minute | . | . | . | . | . | . | . | . | 3. <i>A. hiemalis</i> | |
| Panicles open but narrow, with fairly short capillary branches; palea present, <i>ca</i> half as long as lemma | . | . | . | . | . | . | . | . | | 4 |
| 4. Rhizomatous perennials; panicles up to 30 cm long | . | . | . | . | . | . | . | . | 4. <i>A. gigantea</i> | |
| Stoloniferous perennials; panicles up to 21 cm long, mostly less than 15 cm long | . | . | . | . | . | . | . | . | 5. <i>A. stolonifera</i> | |

1. *Agrostis avenacea* J.F. Gmelin

BLOWNGRASS

Calamagrostis avenacea (J.F. Gmelin) Becherer; *Avena filiformis* G. Forster; *Agrostis filiformis* (G. Forster) Sprengel; *Lachnagrostis filiformis* (G. Forster) Trin.; *C. filiformis* (G. Forster) Cockayne; *Deyeuxia filiformis* (G. Forster) Petrie; *Agrostis retrofracta* Willd.; *Vilfa retrofracta* (Willd.) Beauv.; *L. retrofracta* (Willd.) Trin.; *D. retrofracta* (Willd.) Kunth; *C. retrofracta* (Willd.) Link ex Steudel; *Agrostis debilis* Poiret; *V. debilis* (Poiret) Beauv.; *Agrostis forsteri* Rich. ex Roemer & Schultes; *L. forsteri* (Rich. ex Roemer & Schultes) Trin.; *D. forsteri* (Rich. ex Roemer & Schultes) Steudel; *L. willdenowii* Trin.; *C. willdenowii* (Trin.) Steudel; *Agrostis ligulata* Steudel; *Agrostis solandri* F. Muell. pro parte

Very variable \pm erect glabrous annual 15-75 cm tall. Ligules obtuse, 3-8 mm long, minutely scabrous; leaf blades linear, acute to acuminate, 8-25 cm \times 0.1-0.3 cm, minutely scabrous on nerves. Panicles usually large, branches divaricately spreading, or drooping, subverticillate, capillary; glumes acuminate, subequal, 2-3.5 mm long, 1-nerved, scabrous along keel, occasionally minutely scabrous on sides; lemma truncate, very shortly 4-toothed at apex, 1.2-2 mm long, faintly 4-nerved, villous, awned from *ca* middle, awn geniculate, 2.5-6 mm long; palea slightly shorter than or subequal to lemma. **Fig. 20C.**

Recorded from Moreton, Wide Bay and Darling Downs districts, often associated with heavy soils or moist positions. A winter-spring growing grass.

2. *Agrostis aemula* R. Br.

BLOWNGRASS

Vilfa aemula (R. Br.) Beauv.; *Lachnagrostis aemula* (R. Br.) Trin.; *Deyeuxia aemula* (R. Br.) Kunth; *Calamagrostis aemula* (R. Br.) Steudel; *Agrostis solandri* F. Muell. pro parte; *A. semibarbata* Trin.

Erect glabrous tufted annual 25-60 cm tall. Leaves mainly basal; ligules obtuse, lacinate, 2.5-8 mm long, minutely scabrous; leaf blades linear, acute or acuminate, 8-20 cm \times 0.2-0.7 cm, slightly scabrid on nerves. Panicles large, branches often stiffly spreading, verticillate, capillary; glumes acuminate, unequal, lower glume longer, lower 3.75-5 mm long, upper 3.5-4.5 mm long, 1-nerved, scabrous along keel; lemma truncate and 4-

toothed at apex, 1.75–3 mm long, obscurely nerved, villous, awned from *ca* middle, awn geniculate, 4.5–7.5 mm long; palea shorter than lemma.

Recorded from the Lamington Plateau in the McPherson Ra., and Mt Cordeaux in the Great Dividing Ra., on moist slopes.

3. **Agrostis hiemalis* (Walter) N. L. Britten, Sterns & Poggenb. WINTER BENT
Cornucopiae hyemalis Walter; *Agrostis scabra* var. *elatior* Benth; *A. scabra* auct. non R. Br., Willd.

Erect or ascending loosely tufted glabrous perennial *ca* 15–80 cm tall. Ligules jagged, 2–5 mm long, minutely scabrid; leaf blades linear, flat or becoming involute towards apex, linear, acuminate, 3–15 cm × 0.1–0.4 cm, minutely scabrous on nerves. Panicles spreading, up to 35 cm long, branches subverticillate, capillary; glumes acute, subequal or lower slightly longer, both 1.75–2.5 mm long, 1-nerved, keeled, scabrid along keel; lemma truncate or minutely toothed, 1.25–2 mm long, faintly 5-nerved, glabrous, smooth, unawned; palea absent or very minute.

Native of North America; naturalized in southern Darling Downs district, often in damp or swampy areas.

4. **Agrostis gigantea* Roth REDTOP BENT

Erect glabrous rhizomatous tufted perennial up to 80 cm tall. Ligules obtuse, lacinate, 1.5–6 mm long, minutely scabrous; leaf blades linear, acute to attenuate, 6–20 cm × 0.1–0.8 cm, scabrous on nerves. Panicles rather narrow, up to 30 cm long, branches verticillate, capillary; glumes acuminate, unequal, lower glume slightly longer, lower 2–3 mm long, upper 1.75–2.75 mm long, 1-nerved, scabrid along keel, occasionally minutely scabrid on sides; lemma truncate to minutely toothed, 1.5–2 mm long, obscurely nerved, glabrous, unawned; palea present, *ca* ½ length of lemma.

Widespread in northern temperate regions; naturalized in the Stanthorpe area of the Darling Downs district.

5. **Agrostis stolonifera* L. CREEPING BENT

Erect or ascending stoloniferous perennial up to *ca* 75 cm tall. Ligules obtuse, lacinate, 1.5–7.5 mm long, often minutely scabrous; leaf blades linear, acute, 2–15 cm × 0.1–0.5(–0.8) cm, scabrous on nerves. Panicles rather narrow, up to 21 cm long, mostly less than 15 cm long, branches subverticillate, capillary; glumes acute or acuminate, subequal or lower glume slightly longer, lower 2–2.5 mm long, upper 1.75–2.5 mm long, 1-nerved, scabrid along keel, occasionally minutely scabrid on sides; lemma truncate or minutely toothed, 1.5–2 mm long, obscurely nerved, glabrous, unawned; palea present, *ca* ½ length of lemma. **Fig. 20D.**

Widespread in northern temperate regions; recorded from northern Moreton and Wide Bay districts.

26. POLYPOGON Desf.

Annuals or perennials; culms solitary or tufted. Ligules membranous; leaf blades flat, scabrous. Inflorescences of dense soft spike-like panicles; spikelets solitary, falling entire, laterally compressed, florets 1, bisexual; glumes ± equal, apex entire or bifid, usually with slender straight awn from between lobes; lemma much shorter than glumes, truncate or deeply 2-lobed or minutely 2-toothed, thinly membranous, obscurely 5-nerved, usually with straight slender awn; palea delicate, shorter than lemma, 2-nerved; stamens 3, 2 or 1; ovary glabrous, styles distinct, short, stigmas plumose. Caryopses oblong in outline, cylindrical, sometimes grooved, enclosed by unaltered lemma and palea.

15 species tropical and warm temperate; 4 or 5 species Australia; 1 species south-eastern Queensland.

1. **Polypogon monspeliensis* (L.) Desf. ANNUAL BEARDGRASS
Alopecurus monspeliensis L.; *Phleum crinitum* Schreber

Erect tufted annual up to 80 cm tall; culms often relatively stout. Ligules oblong, blunt or lacinate, 0.3–1.2 cm long; leaf blades linear, attenuate, up to 27 cm × 0.8 cm, scabrous on nerves. Panicles spike-like, dense, 1–15 cm long; glumes bifid, 1.5–2 mm long, 1-

nerved, scabrid on keel and back, ciliate on margin, awns 4–7 mm long; lemma truncate or minutely toothed, *ca* 1 mm long, smooth, glabrous, shining, awn 1–2.5 mm long. **Fig. 20E.**

Native of Europe; naturalized in the Moreton, Wide Bay and Darling Downs districts, often in seepage or swampy areas.

27. LAGURUS L.

Annuals. Ligules membranous; leaf blades flat, soft. Inflorescences of dense spike-like or capitate panicles; spikelets solitary, laterally compressed, rachilla disarticulating above glumes, florets 1, rarely 2, bisexual; glumes \pm equal, membranous, long acuminate, sparsely villous, 1–3-nerved, central nerve produced into densely plumose bristle; lemma shorter than glumes, membranous, long acuminate, apex with 2 setae, 5-nerved, awned from back; palea shorter than lemma, 2-nerved; callus small, minutely hairy; stamens 3; ovary glabrous, styles free, short, stigmas plumose. Caryopses linear-oblong in outline, laterally compressed, soft, tightly enclosed by slightly hardened lemma.

1 species Mediterranean region, naturalized in Australia, occurring in south-eastern Queensland.

1. **Lagurus ovatus* L.

HARE'S TAIL GRASS

Softly pubescent annual 5–75 cm tall; culms solitary or tufted, erect or ascending. Ligules obtuse, 1–3 mm long, pilose; leaf blades linear-triangular, attenuate, 1–20 cm \times 0.2–1.4 cm, pilose. Panicles contracted, ovoid to obloid-cylindrical, 1–7 cm long; glumes long acuminate and tapering into densely plumose bristle, 0.9–1.1 cm long, villous pubescent; lemma 4–5 mm long, tipped by setae 4–7.5 mm long, minutely scabrid, awn \pm straight or bent, 0.8–1.6 cm long. **Fig. 20F.**

Native of Mediterranean region; recorded from southern parts of the region.

28. ALOPECURUS L.

Tufted perennials or rarely annuals. Ligules membranous, obtuse; leaf blades flat. Inflorescences of dense spike-like soft panicles; spikelets solitary, laterally compressed, falling entire at maturity, floret 1, bisexual; glumes \pm equal, acute, margins united towards base, keeled, 3-nerved, awnless; lemma equal to or shorter than glumes, thin, margins united towards base, keeled, 3–5-nerved, awned from below or about middle; palea absent; stamens 3; ovary glabrous, styles distinct, stigmas plumose. Caryopses ovate or narrowly ovate in outline, somewhat flattened, included in but free from dehiscent lemma.

50 species temperate Eurasia, temperate South America; 4 species Australia; 2 species south-eastern Queensland.

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|---|---|---|---|--------------------------|
| 1. Glumes obtuse, 2–3 mm long; lemmas 2–3 mm long | . | . | . | 1. <i>A. geniculatus</i> |
| Glumes acute, 5–5.5 mm long; lemmas 4.5–6 mm long | . | . | . | 2. <i>A. myosuroides</i> |

1. **Alopecurus geniculatus* L.

MARSH FOXTAIL

Alopecurus australis Nees

Slender tufted perennial or occasionally apparently annual, 5–60 cm tall; culms erect or geniculate. Ligules tapering to blunt point, often lacerated, 3–5 mm long, minutely scabrous; leaf blades linear, attenuate, up to 20 cm \times 0.4 cm, minutely scabrous. Panicles dense, narrow, 1.5–6 cm \times 0.3–0.7 cm; glumes obtuse to mucronate, 2–3 mm long, united basally or lowest 0.5 mm only, ciliate along keel, and often on basal third, often minutely scabrid on sides; lemma acute to blunt, 2–3 mm long, glabrous, awn from below middle, 4–8 mm long. **Fig. 20G.**

Native of northern temperate regions; recorded from Darling Downs district, growing on edge of fresh water swamps or drains.

2. **Alopecurus myosuroides* Huds.

SLENDER FOXTAIL; BLACKGRASS

Alopecurus agrestis L.

Slender tufted annual up to 60 cm tall. Ligules truncate to obtuse, irregularly dentate,

1–5 mm long; leaf blades linear, attenuate, up to 22 cm × 0.4 cm, minutely scabrous on nerves. Panicles dense, narrow, 2–12 cm × 0.4–0.9 cm; glumes acute, 5–5.5 mm long, united for 1.5–2 mm at base, ciliate along at least lower half of keels, scabrid along rest, minutely scabrid on sides; lemma acute to blunt, 4.5–6 mm long, glabrous, awn from below middle, 8–10 mm long.

Native of Eurasia; recorded from Moreton and Darling Downs districts.

29. PHLEUM L.

Erect annuals or perennials. Ligules membranous; leaf blades linear, convolute in bud, later flat. Inflorescences of dense cylindrical spike-like panicles; spikelets solitary, laterally compressed, rachilla disarticulating above glumes, shortly extended, florets 1, bisexual; glumes equal, membranous, abruptly truncate, strongly keeled, keel produced into mucro or short awn, 3–5-nerved, usually ciliate along keel; lemma much shorter than glumes, membranous, truncate or denticulate, keeled, 1–7-nerved, unawned; palea nearly as long as lemma, narrow, hyaline; stamens 2 or 3; ovary glabrous, styles distinct, rather long, stigmas plumose. Caryopses ovoid, included in but free from unaltered lemma and palea.

15 species temperate Eurasia, North America to Mexico, temperate South America; 2 species Australia; 1 species south-eastern Queensland.

1. **Phleum subulatum* (Savi) Aschers. & Graebner

Phalaris subulata Savi; *Phleum tenue* (Host) Schrader

Erect annual, without non-flowering shoots, up to 60 cm tall, usually much less. Ligules obtuse, often lacerated, 2–5 mm long; leaf blades linear, attenuate, 1.5–12 cm × 0.1–0.4 cm, minutely scabrous on nerves. Panicles very dense and narrow, 0.8–11 cm × 0.2–0.7 cm; spikelets very strongly compressed; glumes ± elliptic, mucronate, 2–2.5 mm long, strongly keeled, keel not winged nor ciliate, prominently 3-nerved, scabrid; lemma ca 1 mm long, 7-nerved. **Fig. 20H.**

Native of Europe; recorded from Brisbane environs.

30. ECHINOPOGON Beauv.

Slender erect tufted or rhizomatous perennials. Leaves widely separated along culms; ligules membranous; leaf blades flat, usually short. Inflorescences dense ovoid to obloid-cylindrical spike-like panicles; spikelets solitary, rachilla disarticulating above glumes, shortly produced, florets 1, bisexual; glumes subequal, acute, keeled, 1-nerved, with stiff hairs or bristles along keel, ciliate along margin; lemma subequal to glumes, apex acutely 2-lobed, 5–11-nerved, awned from between or behind apical lobes; palea as long as lemma, minutely 3-lobed apically, 2-nerved, ciliolate on apex and margins; callus small, silky hairy; stamens 3; ovary glabrous, styles distinct, stigmas shortly plumose. Caryopses narrowly ellipsoid, tightly embraced by lemma and palea.

7 species Australia and New Zealand; 7 species Australia; 4 species south-eastern Queensland.

Species of *Echinopogon* can be poisonous to stock under certain conditions.

- | | |
|--|--------------------------|
| 1. Glumes 5–7.5 mm long or, rarely, if 4.5 mm long then inflorescences nodding or inclined | 2 |
| Glumes 2.5–4.5 mm long; inflorescences ± erect | 3 |
| 2. Panicles stiffly erect, up to twice as long as broad (excluding awns) | 1. <i>E. intermedius</i> |
| Panicles nodding or inclined, three or more times as long as broad (excluding awns) | 2. <i>E. nutans</i> |
| 3. Culms arising from slender underground rhizome; leaf blades spreading or deflexed | 3. <i>E. ovatus</i> |
| Culms tufted; leaf blades erect | 4. <i>E. caespitosus</i> |

1. *Echinopogon intermedius* C. E. Hubbard**ERECT HEDGEHOG GRASS**

Erect or ascending tufted perennial up to 1.2 m tall. Ligules truncate to obtuse, 0.5–2 mm long; leaf blades linear to linear-ovate, attenuate, 3–20 cm × 0.3–0.8 cm, minutely scabrous. Panicles spike-like, 1.5–3 cm × 1–1.5 cm, peduncle not distinctly narrowed below inflorescence; glumes acuminate, 5–7.5 mm long, with bristles along keel, smooth elsewhere; lemma 5–8 mm long with acuminate lobes 1.5–4 mm long, minutely scabrous, awn arising from base of apical lobes, 1–2.6 cm long.

Darling Downs district in the Stanthorpe-Inglewood area.

2. *Echinopogon nutans* C. E. Hubbard**NODDING HEDGEHOG GRASS**

Weak slender ascending perennial up to ca 60 cm tall. Ligules ± truncate, apex irregularly dentate, 0.5–1 mm long; leaf blades linear to linear-ovate, attenuate, 2–21 cm × 0.2–0.4 cm, minutely scabrous, occasionally sparsely pubescent. Panicles spike-like, 1.7–6 cm × 0.5–1.2 cm, peduncle distinctly attenuate below inflorescence; glumes acuminate, (4.5–)5–7 mm long, with bristles along keel, scabrid on sides; lemma (4–)5–6.5 mm long, with acuminate lobes 0.5–2 mm long, minutely scabrid, awn arising from base of apical lobes, 0.7–1.8 cm long. **Fig. 20I.**

Recorded from all districts of the region, in areas of better rainfall, usually in eucalypt open forest.

3. *Echinopogon ovatus* (G. Forster) Beauv.**FOREST HEDGEHOG GRASS**

Agrostis ovata G. Forster; *Cinna ovata* (G. Forster) Kunth; *Echinopogon sieberi* Steudel
Erect slender perennial 15–100 cm tall, culms arising singly or several together from slender underground rhizome. Ligules obtuse or laciniate, 1–2 mm long; leaf blades linear to very narrowly ovate, attenuate, 2–16 cm × 0.2–0.7 cm, scabrous, sometimes sparsely pubescent. Panicles spike-like, 0.7–4 cm × 0.4–1 cm, peduncle not distinctly narrowed below inflorescence; glumes acute to acuminate, 2.5–4.5 mm long, with stiff bristles along keel, often scabrid on sides; lemma 3–5 mm long, with acuminate lobes 0.5–1.5 mm long, scabrid, awn arising from base of apical lobes, 0.3–1.5 cm long. **Fig. 20J.**

Recorded from Moreton and Darling Downs districts, usually under eucalypt open forest in moister or more fertile sites, e.g. Killarney area, Beechmont.

4. *Echinopogon caespitosus* C. E. Hubbard**TUFTED HEDGEHOG GRASS**

Erect tufted perennial up to 1.3 m tall. Ligules obtuse or lacerated, 1–4 mm long; leaf blades linear, attenuate, 3–32 cm × 0.2–0.6 cm, scabrous. Panicles spike-like, 1.5–9 cm × 0.5–1.4 cm, peduncle not distinctly narrowed below inflorescence; glumes acuminate, 3–4.5 mm long, with stiff bristles along keel, often scabrid on sides; lemma 3.5–5.5 mm long, with acuminate lobes 0.4–1.5 mm long, minutely scabrid; awn arising from base of apical lobes, 0.4–1.5 cm long.

Recorded from the Darling Downs district and higher altitude parts of the Moreton district, usually in open forest.

31. DICHELACHNE Endl.

Tufted annuals or perennials. Ligules membranous; leaf blades flat or convolute. Inflorescences of dense cylindrical spike-like or loose panicles; spikelets solitary, pedicellate, numerous and overlapping on short branches, rachilla disarticulating above glumes, florets 1, bisexual; glumes similar, subequal, narrow, keeled, 1-nerved; lemma shorter than glumes, entire or bifid, obscurely nerved, awned from below apex, awn slender, curved or bent, column spirally twisted; palea narrow, slightly shorter than lemma, 2-keeled; callus hairy; stamens 3 or 2; ovary glabrous, styles short, distinct, stigmas plumose. Caryopses subterete, narrow, shining, pale.

9 species Australia and New Zealand; 9 species Australia; 5 species south-eastern Queensland.

This genus is badly in need of revision.

1. Inflorescences dense, spike-like, or sometimes slightly spreading
towards base

Inflorescences always loose, axis and branches distinctly visible

2
4

- | | | |
|---|----------------------------|---|
| 2. Awns 2–5 cm long; glumes subulate, lower 4.5–7.5 mm long | 1. <i>D. crinita</i> | 3 |
| Awns 0.6–2(–2.2) cm long; glumes acuminate, lower 2.5–5 mm long | | |
| 3. Lemmas \pm equal to length of lower glume | 2. <i>D. micrantha</i> | |
| Lemmas <i>ca</i> 1 mm shorter than lower glume | 3. <i>D. rara</i> | |
| 4. Small plants up to <i>ca</i> 35 cm tall; inflorescences 3–8 cm long | 4. <i>D. parva</i> | |
| Slender taller plants up to <i>ca</i> 100 cm tall; inflorescences 10–25 cm long | 5. <i>D. inaequiglumis</i> | |

1. *Dichelachne crinita* (L. f.) J. D. Hook.**LONGHAIR PLUMEGRASS**

Anthoxanthum crinitum L. f.; *Dichelachne longiseta* Trin. & Rupr.

Tufted perennial up to 1 m tall; culms erect or ascending, glabrous. Ligules truncate to obtuse, 0.5–1.5 mm long, minutely scabrous; leaf blades linear, attenuate, 4.5–32 cm \times 0.1–0.7 cm, minutely scabrous, occasionally sparsely pubescent. Panicles dense, spike-like, 6–20 cm long; glumes subulate, scabrid along keel, smooth or minutely scabrid on side, unequal, lower shorter than upper, lower 4.5–7.5 mm long, upper 5–8.5 mm long; lemma subulate, 2-lobed, 3–6 mm long, minutely scabrid or sometimes smooth, awn arising 0.7–2.5 mm from lemma apex, curved and not or scarcely twisted, 2–5 cm long.

Recorded from eastern Darling Downs, Burnett and Moreton districts.

There may be more than one taxon under this name as there appears considerable variation in the length of glumes and lemma, and position of insertion of the awn on the lemma. The taxon with awns 4–5 cm long arising 1.5–2 mm from lemma apex has been called *D. longiseta*, but in other characters it is within the range of variation of *D. crinita*.

2. *Dichelachne micrantha* (Cav.) Domin**SHORTHAIR PLUMEGRASS**

Stipa micrantha Cav.; *Agrostis sciurea* R. Br.; *Dichelachne sciurea* (R. Br.) J. D. Hook.; *D. crinita* var. *intermedia* Hackel ex Cheeseman

Tufted perennial up to *ca* 1 m tall; culms erect, \pm glabrous. Ligules obtuse or lacerated, 0.5–1.5 mm long, minutely scabrous; leaf blades linear, attenuate, 4–36 cm \times 0.1–0.4 cm, minutely scabrous. Panicles dense, spike-like or sometimes slightly spreading, 5–20 cm long; glumes long acuminate, scabrid along keels, \pm minutely scabrid on sides, unequal, lower shorter than upper, lower 2.5–4.5 mm long, upper 3–5.5 mm long; lemma acuminate, 2-lobed, 2.75–4.5 mm long, minutely scabrid, awn arising 0.5–1 mm from lemma apex, curved and scarcely twisted, 0.6–2.2 cm long.

Recorded from all districts in the region.

A dwarf form with awns less than 1 cm long may be a separate taxon.

3. *Dichelachne rara* (R. Br.) Vickery

Agrostis rara R. Br.; *Dichelachne novoguineensis* (Pilger) Pilger

Stout or slender tufted perennial up to *ca* 1.3 m tall; culms erect, glabrous. Ligules \pm truncate, sometimes asymmetric, 0.5–2.5 mm long, often ciliate at apex; leaf blades linear, attenuate, 4–36 cm \times 0.1–0.5 cm, minutely scabrous. Panicles dense, spike-like or sometimes slightly spreading, 5–20 cm long; glumes long acuminate, scabrid on nerves, minutely scabrid on sides, subequal to unequal, lower shorter than upper, lower 4–5 mm long, upper 4.2–5.5 mm long; lemma acuminate, 2-lobed, 2.5–4 mm long, minutely scabrid, awn arising 0.7–1 mm from lemma apex, curved and twisted, 0.8–2.2 cm long.

Fig. 20K.

Moreton and southern Darling Downs districts, often growing in rocky areas.

4. *Dichelachne parva* B. Simon

Slender tufted perennial up to 35 cm tall; culms erect or geniculately ascending. Ligules \pm truncate to obtuse, 0.2–1 mm long; leaf blades linear, attenuate, 2–8 cm \times *ca* 0.1 cm, smooth, or slightly pubescent on underside. Panicles loose, 3–8 cm long, axis and branches clearly visible; glumes acuminate, minutely scabrid along keel, unequal, lower shorter than upper, lower 3.5–5 mm long, upper 4–5.5 mm long; lemma acuminate, 2-

lobed, 4.5–6 mm long, minutely scabrous, awn arising 0.7–1.2 mm from lemma apex, curved and twisted, 0.7–1.5 cm long.

Recorded from the Granite Belt in the Darling Downs district, on montane sandy areas in moist habitats.

5. *Dichelachne inaequiglumis* (Hackel ex Cheeseman) Edgar & Connor

Dichelachne sciurea (R. Br.) J. D. Hook. var. *inaequiglumis* Hackel ex Cheeseman; *D. micrantha* (Cav.) Domin var. *inaequiglumis* (Hackel ex Cheeseman) Domin

Slender tufted perennial up to ca 1 m tall; culms \pm erect. Ligules obtuse to asymmetrical, 0.5–1 mm long, often minutely scabrous; leaf blades linear, attenuate, 3–20 cm \times 0.1–0.3 cm, minutely scabrous. Panicles loose, 10–25 cm long, axis and branches clearly visible; glumes long acuminate, scabrid along keel, smooth or minutely scabrid along sides, unequal, lower shorter than upper, lower 4.5–5 mm long, upper 5–6 mm long; lemma acuminate, 2-lobed, 5–6 mm long, minutely scabrid, awn arising 0.5–1 mm from lemma apex, curved, not or sometimes twisted, 1.5–2.2 cm long.

Recorded from the Stanthorpe area of the Darling Downs district.

32. PHALARIS L.

Annuals or perennials with either short-contracted or elongated rhizomes. Ligules membranous, long; leaf blades linear, flat. Inflorescences of stiff, dense, ovoid to \pm cylindrical spike-like panicles; spikelets solitary or in clusters, laterally compressed, rachilla disarticulating above glumes, florets 2 or 3, lower 1 or 2 sterile or rarely male, uppermost bisexual; glumes subequal, longer than and enclosing fertile floret, 3-nerved, strongly keeled and often winged on keel; sterile lemmas linear to narrowly ovate, membranous, or \pm obsolete, fertile lemma ovate, acute, obscurely 5-nerved, glabrous or pubescent, often shining; palea similar to but shorter than lemma, obscurely 2-nerved, glabrous; stamens 3; styles distinct, stigmas 2, plumose. Caryopses somewhat compressed, elongate, enclosed by lemma and palea.

20 species northern and southern temperate; 8 species and 2 hybrids naturalized Australia; 5 species and 2 hybrids south-eastern Queensland.

- | | | |
|---|--|---|
| 1. Fertile spikelets subtended by 6 or 7 sterile spikelets | 1. <i>P. paradoxa</i> | 2 |
| Fertile spikelets not subtended by sterile spikelets | | |
| 2. Sterile lemmas \pm equal, 0.7 mm or more long | | 3 |
| Sterile lemmas unequal, lower very small, or both minute or absent | | 4 |
| 3. Sterile lemmas 0.7–1.5 mm long | 2. <i>P. angusta</i> | |
| Sterile lemmas 2.5–4.5 mm long | 3. <i>P. canariensis</i> | |
| 4. Glumes with wing along keel widening towards apex, 0.4–0.7 mm wide; both sterile lemmas 0.3–0.4 mm long | 4. <i>P. \times daviesii</i> | |
| Glumes with wing along keel either narrow or gently crescent-shaped, up to 0.5 mm long; one sterile lemma 1–1.5 mm long, the other minute | | 5 |
| 5. Glumes acuminate; annual grass | 5. <i>P. minor</i> | |
| Glumes acute; perennial grass | | 6 |
| 6. Tufted perennials; sterile lemma ca 1.5 mm long | 6. <i>P. aquatica</i> | |
| Rhizomatous perennials; sterile lemma 1–1.2 mm long | 7. <i>P. aquatica</i> \times <i>P. arundinacea</i> | |

1. **Phalaris paradoxa* L.

PARADOXA GRASS

Glabrous tufted annual 2–50, rarely –100 cm tall; culms fasciculate, \pm geniculate at base, finally erect. Ligules \pm obtuse, often oblique and irregularly dentate, 3–5 mm long; leaf blades linear, attenuate, 10–20 cm \times 0.2–0.9 cm, minutely scabrous. Panicles not fully or shortly exerted from uppermost inflated leaf sheath, 2–9 cm long; spikelets falling readily from panicle in groups of ca 7, ca 6 sterile florets clustered around 1 fertile



Fig. 20 POACEAE — A–B *Deyeuxia* spp. — A *D. gunniana*, inflorescence showing short spreading branchlets x 2; B *D. decipiens*, spikelet x 9; C–D *Agrostis* spp. — C *A. avenacea*, spikelet x 9; D₁–D₂ *A. stolonifera*, D₁ narrow inflorescence x 1, D₂ spikelet x 9; E *Polypogon monspeliensis*, spikelet x 9; F₁–F₂ *Lagurus ovatus*, F₁ inflorescence x 1/2, F₂ spikelet x 6; G *Alopecurus geniculatus*, spikelet x 9; H *Phleum subulatum*, spikelet x 9; I–J *Echinopogon* spp. — I₁–I₂ *E. nutans*, I₁ inflorescence showing attenuate peduncle x 1, I₂ spikelet x 6; J *E. ovatus*, showing rhizomatous base x 1; K₁–K₂ *Dichelachne rara*, K₁ inflorescence x 1, K₂ spikelet x 6.

floret, sterile spikelets often unequal in size or some obsolete, glumes empty or enclosing sterile lemma; glumes of fertile spikelet long acuminate, 5.5–8 mm long, winged with often tooth-like forward pointing appendage, margin often denticulate; sterile lemmas at base of fertile lemma, translucent, membranous, *ca* 0.3 mm long, usually obscure or apparently absent, fertile lemma 2.5–3.5 mm long, smooth, shining, glabrous. **Fig. 21A.**

Native of Mediterranean region, now widely naturalized elsewhere; recorded from all districts of the region though mainly Darling Downs district, a weed of disturbed sites. Palatable to stock in young stages.

2. **Phalaris angusta* Nees ex Trin.

Erect \pm slender annual up to 1.5 m tall. Ligules truncate, often lacerated, 2–6 mm long; leaf blades linear, acuminate, 4–30 cm \times 0.3–1.1 cm, minutely scabrous on nerves. Panicles partly enclosed by uppermost leaf sheath or at length exserted, narrow, 2.5–17 cm long; spikelets all alike; glumes acute, 3–5.5 mm long, very narrowly winged, wing scabrid on margin, *ca* 0.25 mm broad; sterile lemmas 2, narrow, 0.7–1.5 mm long, fertile lemma 2–4 mm long, smooth, shining, appressed pilose.

Native of South America and southern United States; recorded from southern Moreton district. Reported to be excellent winter fodder.

3. **Phalaris canariensis* L.

CANARY GRASS

Tufted annual 0.15–1.2 m tall; culms erect or basally geniculate. Ligules obtuse, 3–8 mm long; leaf blades linear, attenuate, 5–30 cm \times 0.4–1.2 cm, minutely scabrous on nerves. Panicles exserted from uppermost slightly inflated leaf sheath, 1.5–4.5 cm long; spikelets all alike; glumes abruptly acuminate, 6–8(–10) mm long, sparsely pubescent, wing along keel gently crescent-shaped, margin entire, *ca* 0.5–0.8 mm wide; sterile lemmas at base of fertile lemma, narrow, 2.5–3.5(–4.5) mm long, fertile lemma 4.5–5.5(–6.5) mm long, smooth, shining, appressed pubescent. **Fig. 21B.**

Native of the Mediterranean region, now widely naturalized; recorded from Darling Downs, Wide Bay and Moreton districts. Cultivated for grain for caged birds; palatable to stock in young stages; occasionally a weed.

4. **Phalaris* \times *daviesii* S. T. Blake

Tufted perennial 1–1.5 m tall; culms geniculate. Ligules obtuse to acute, 6–10 mm long; leaf blades linear, attenuate, 20–50 cm \times 1.2–2 cm, scabrous on nerves. Panicles long exserted from uppermost leaf sheath, 7–12.5 cm long; spikelets in groups, but all fertile; glumes equal, acute, 6–6.5 mm long, wing along keel widening towards apex, margin denticulate, *ca* 0.4–0.7 mm wide; sterile lemmas at base of fertile lemma, 0.3–0.4 mm long, obscure, fertile lemma 3.5–4 mm long, smooth, shining, appressed pilose.

Cultivated experimentally in the Moreton district, but apparently volunteers freely where trials held; may be naturalized.

This is the hybrid *P. minor* Retz. \times *P. aquatica* L.

5. **Phalaris minor* Retz.

LESSER CANARY GRASS

Erect tufted annual 0.1–1 m, rarely –1.8 m tall; culms sometimes basally geniculate. Ligules \pm truncate, lacerated, 4–10 mm long; leaf blades linear-attenuate to linear-triangular, 2–30 cm \times 0.4–1.3 cm, minutely scabrous on nerves. Panicles slightly or totally exserted from uppermost inflated leaf sheath, 1–9 cm long; spikelets all alike; glumes acuminate, 4–6.5 mm long, wing along keel gently crescent-shaped, margin denticulate, *ca* 0.3–0.5 mm broad; sterile lemma at base of fertile lemma, narrow, *ca* 1–1.5 mm long, 1 minute or absent, fertile lemma 3–3.5 mm long, smooth, shining, appressed pubescent.

Native of Mediterranean region, now widely naturalized; recorded from Moreton, Wide Bay and Darling Downs districts. Palatable to stock in young stages and suitable for hay.

6. **Phalaris aquatica* L. PHALARIS; AUSTRALIAN PHALARIS; TOOWOOMBA CANARY GRASS

Phalaris tuberosa L.; *P. commutata* Roemer & Schultes; *P. stenoptera* Hackel; *P. tuberosa* var. *stenoptera* (Hackel) A. S. Hitchc.

Erect tufted perennial 0.3–1.5 m tall; culms occasionally rooting at lower nodes. Ligules

truncate or lacerated, 0.2–1.2 cm long; leaf blades linear attenuate, 3–45 cm \times 0.2–1.4 cm, minutely scabrous on nerves. Panicles long exerted from uppermost leaf sheath, 2.5–15 cm long, spikelets all alike; glumes acute, 4.5–5.5 mm long, wing towards apex of glume gently crescent-shaped, margin denticulate, *ca* 0.3–0.5 mm broad; sterile lemma narrow, *ca* 1.5 mm long, 1 minute or obsolete, fertile lemma 3–4 mm long, smooth, shining, appressed pilose. **Fig. 21C.**

Native of Mediterranean region, widely cultivated in temperate parts; recorded from Darling Downs district. Valuable perennial pasture grass but can be toxic to stock under certain conditions.

7. **Phalaris aquatica* L. \times *P. arundinacea* L.

RONPHA GRASS

Erect perennial up to 1.5 m tall with rhizomes; culms stout, often geniculate. Ligules \pm truncate or lacerated, 2–10 mm long; leaf blades linear, attenuate, 5–45 cm \times 0.3–1.5 cm, minutely scabrous on nerves. Panicles long exerted from uppermost leaf sheath, 2.5–15(–24) cm long; spikelets all alike; glumes acute, 5.5–6 mm long, wing towards apex of glume very narrow, denticulate along margin, *ca* 0.2–0.4 mm wide; sterile lemma narrow, 1–1.2 mm long, 1 minute or obsolete, fertile lemma 3–4 mm long, smooth, shining, appressed pilose.

Recorded from the Darling Downs district.

33. ELYMUS L.

Densely to loosely tufted perennials. Ligules membranous, short; leaf blades flat or rarely involute, slender. Inflorescences of erect or nodding spikes, rachis tough; spikelets 1–3 per node, slightly compressed laterally, usually imbricate, rachilla disarticulating above glumes and between florets, florets 3–9, bisexual; glumes narrowly ovate or narrowly oblong, obtuse to shortly awned, 3–9-nerved, rounded, or keeled in upper half, firmly membranous or coriaceous; lemmas narrowly ovate, obtuse, acute or bidentate, mucronate or awned, 5-nerved, rounded on back or keeled at apex; paleas 2-keeled; callus \pm hirsute. Caryopses obloid or linear-obloid, flat or subconvex on inner side.

About 150 species temperate; 6 species Australia; 2 species south-eastern Queensland.

- | | | | | | | | |
|-------------------------------|---|---|---|---|---|---|--------------------------|
| 1. Awns more than 1.5 cm long | . | . | . | . | . | . | 1. <i>E. scabrus</i> |
| Awns less than 1.5 cm long | . | . | . | . | . | . | 2. <i>E. multiflorus</i> |

1. *Elymus scabrus* (R. Br.) A. Löve

COMMON WHEATGRASS

Triticum scabrum R. Br.; *Agropyrum scabrum* (R. Br.) Beauv; *Festuca scabra* auct. non Vahl, Labill.

Loosely tufted perennial up to *ca* 60 cm tall. Ligules truncate, up to *ca* 0.5 mm long; leaf blades linear, flat or convolute, attenuate, 5–25 cm \times 0.2–0.4 cm, often sparsely to moderately hispid. Spikes elongated, (5–)15–25 cm long; spikelets distant at least at base, 1.5–2.5 cm long excluding awns; glumes obtuse, mucronate, acute to acuminate, 0.5–1.4 cm long, 3–8-nerved; lemmas 0.7–1.3 cm long, smooth or minutely hispid towards apex, awns straight or curved, 1.5–3.5 cm long.

Two varieties occur in the region:

- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. Glumes narrow, acuminate, 0.5–1 cm long, 3- or 4-, rarely 5-nerved | . | . | . | . | . | . | <i>E. scabrus</i> var. <i>scabrus</i> |
| Glumes broad, obtuse-mucronate to acute, 0.8–1.4 cm long, 6–8-nerved | . | . | . | . | . | . | <i>E. scabrus</i> var. <i>plurinervis</i> |

E. scabrus var. *scabrus* (**Fig. 21D.**) has been recorded throughout the region generally on sandy soils, while *E. scabrus* var. *plurinervis* (Vickery) B. Simon (*Agropyron scabrum* (R. Br.) Beauv. var. *plurinerve* Vickery) is recorded mainly from the Darling Downs district.

2. *Elymus multiflorus* (Banks & Solander ex J. D. Hook.) Löve & Connor

Triticum multiflorum Banks & Solander ex J. D. Hook.; *Agropyron multiflorum* (Banks & Solander ex J. D. Hook.) Kirk ex Cheeseman

Tufted perennial up to *ca* 1.2 m tall. Ligules truncate-erose, *ca* 0.5–0.75 mm long; leaf blades linear, generally flat, rarely convolute, attenuate, 8–30 cm \times 0.3–0.7 cm, glabrous

or occasionally sparsely pubescent. Spikes elongated, 10–30 cm long; spikelets distant at least at base, 1.5–2.5 cm long excluding awns; glumes ovate, long acuminate to acute, 6–8 mm long, 3–5-nerved; lemmas 8–9 mm long, usually minutely hispid towards apex and hispid on margin, awns straight, 0.4–1.7 cm long.

Throughout the region, on black soils.

34. AUSTRALOPYRUM (Tzvelev) A. Löve

Usually densely tufted perennials. Ligules membranous, short, abrupt; leaf blades rigid and erect, flat or convolute, softly pubescent. Inflorescences of dense erect spikes, rachis tough, pubescent, notched; spikelets imbricate and laterally compressed, \pm distinctly pedicellate, florets 5–9; glumes persistent, rigid, usually 3-nerved; lemmas slightly involute, 5–7-nerved, awned; paleas 2-keeled; stamens 3; stigmas plumose.

2 species Australia; 1 species south-eastern Queensland.

1. *Australopyrum pectinatum* (Labill.) A. Löve

COMB WHEATGRASS

Festuca pectinata Labill.; *Triticum pectinatum* (Labill.) R. Br.; *Vulpia pectinata* (Labill.) Nees; *T. brownei* Kunth; *Agropyrum pectinatum* (Labill.) Beauv.; *Agropyrum retrofractum* Vickery; *Australopyrum retrofractum* (Vickery) A. Löve

Erect tufted perennial *ca* 20–65 cm tall. Ligules truncate, *ca* 0.5 mm long; leaf blades linear, attenuate, up to 25 cm \times 0.4 cm, scabrous, lower surface densely hirsute interspersed with much shorter hairs as well. Spikes 1.5–10 cm long on long exserted peduncles, spikelets placed sideways to rachis; glumes persistent, narrowly triangular, subulate, margin \pm inrolled and narrowly chartaceous, subequal, 6–7 mm long, often 5- or 7-nerved, glabrous, smooth, sharply reflexed outwards to downwards at maturity; lemmas narrowly ovate, acuminate or with awn 0.5–6 mm long, margin narrowly chartaceous, 9–10 mm long, 5–7-nerved, glabrous or loosely hirsute. **Fig. 21E.**

Recorded from moderately high altitudes in southern areas, e.g. near Warwick.

35. TRITICUM L.

Annuals. Ligules membranous; leaf blades flat, with conspicuous basal auricles. Inflorescences of linear spikes, rachis \pm zigzag; spikelets solitary, sessile, rachilla disarticulating above glumes and between lemmas, florets 3–9, bisexual or uppermost sterile; glumes rigid, apex obtuse-truncate, bidentate, mucronate or awned, \pm equal, \pm keeled; lemmas usually exserted from glumes, rigid, broad, apex abruptly mucronate or awned, rounded on back or keeled near apex; paleas shorter than lemmas or nearly as long, 2-keeled, keels ciliate; stamens 3; ovary pubescent or villous apically, styles 2, short, stigmas plumose. Caryopses ovoid or obloid, grooved in front, enclosed by lemma and palea, either entirely free or adhering to both.

10–20 species eastern Mediterranean to Iran but many species widely cultivated; 2 species cultivated Australia; 1 species naturalized south-eastern Queensland.

1. **Triticum aestivum* L.

WHEAT

Triticum hybernum L.; *T. sativum* Lam.; *T. vulgare* Vill.; *T. cereale* Schrank

Tufted very variable annual 0.4–1.3 m tall; culms erect, firm, hollow, thin walled. Ligules obtuse, 1–2 mm long; leaf blades linear, attenuate, 8–32 cm \times 0.3–1 cm, glabrous to sparsely pubescent. Spikes 3–12 cm long excluding awns, cultivated forms often larger; spikelets 0.8–1.8 cm long; glumes 0.6–1.2 cm long, glabrous or somewhat pubescent, awn 0.05–0.7(–1.5) cm long; lemma 0.8–1.6 cm long, glabrous or sometimes somewhat pubescent, awnless or awn up to 9 cm long. **Fig. 21F.**

Native of the Middle East; recorded occurring spontaneously in the Darling Downs and Moreton districts.

\times **Triticale** is a man made hybrid between *Triticum aestivum* and *Secale cereale* L., RYE or RYECORN, which resembles a vigorous rye plant. It is grown as a cereal and forage crop and may become locally naturalized.



Fig. 21 POACEAE — A–C *Phalaris* spp. — A *P. paradoxa*, group of spikelets showing small sterile spikelets clustered around base of fertile spikelet x 6; B *P. canariensis*, showing \pm equal sterile lemmas x 6; C *P. aquatica*, exploded view of spikelet showing unequal sterile lemmas x 6; D₁–D₂ *Elymus scabrus* var. *scabrus*, D₁ inflorescence x 1, D₂ spikelet x 3; E *Australopyrum pectinatum*, inflorescence showing glumes sideways to rachis and 1 remaining spikelet (arrowed) x 1; F₁–F₃ *Triticum aestivum*, F₁–F₂ inflorescence, F₁ without awns, F₂ with awns, both x 1, F₃ spikelet x 3; G₁–G₂ *Critesion murinum* subsp. *glaucum*, G₁ inflorescence x 1, G₂ spikelet x 3.

36. CRITESION Raf.

Tufted perennials, biennials or annuals; culms slender, erect or nodding. Ligules membranous; leaf blades flat. Inflorescences very dense, somewhat flattened spikes, rachis fragile; spikelets 3 per node, central one only \pm sessile with 1 bisexual floret, lateral spikelets pedicellate with 1 sterile or male floret, rachilla tough; glumes very slender, subulate or subulate-setaceous, sometimes basally dilated, 1-nerved; lemma narrowly ovate, back rounded, usually with long awn; palea 2-keeled, margin rolled; stamens 3; styles terminal, short, stigmas plumose. Caryopses linear to obloid, usually adhering to lemma and palea at maturity.

34 species temperate; 3 species naturalized Australia; 1 species south-eastern Queensland.

1. ****Critesion murinum* (L.) A. Löve subsp. *glaucum* (Steudel) B. Simon** NORTHERN BARLEY GRASS

Hordeum glaucum Steudel; *H. murinum* L. subsp. *glaucum* (Steudel) Tzvelev; *Critesion glaucum* (Steudel) A. Love; *H. leporinum* Link subsp. *glaucum* (Steudel) Booth & Richards; *H. stebbinsii* Covas

Tufted annual up to 30 cm tall; culms erect or ascending. Ligules truncate or erose, 0.5–1 mm long, leaf blades linear-ovate, flat, attenuate, 3–20 cm \times 0.2–0.6 cm, sparsely pubescent. Spikes dense, 1.5–7 cm long; fertile spikelets 6–10 mm long, sterile reduced to awn-like lemma; glumes subulate-setaceous, ciliate on margin, 1–2.2 cm long including awn; lemma ovate, 6–10 mm long, smooth or slightly hispid on margin towards apex, awn terminal, 1–3 cm long, much longer than awns on glumes. **Fig. 21G.**

Recorded from Darling Downs district.

***Critesion hystrix* (Roth) A. Löve** (*Hordeum hystrix* Roth; *H. geniculatum* All.), MEDITERRANEAN BARLEY GRASS, has been collected twice in the region from the vicinity of buildings, where it has apparently been introduced as an impurity of wheat imported from other states. It can be distinguished by the awns of at least the 2 lateral lemmas being shorter than those of the glumes.

37. ARUNDO L.

Perennial grasses; rhizomes horizontal, usually thick; culms tall, stout, almost woody. Ligules membranous, very short; leaf blades flat. Inflorescences of large, feathery, contracted or effuse panicles; spikelets solitary, pedicellate, rachilla disarticulating above glumes and between lemmas, florets 2–7, bisexual or sterile; glumes \pm equal, narrow, keeled, 3-nerved, glabrous; lemmas broader than glumes, entire or finely bifid with short mucro from sinus, 3–9-nerved, pubescent on back; paleas shorter than lemma, membranous, 2-keeled; stamens 3; style distinct, long; stigmas plumose. Caryopses oblong in outline, free from but enclosed by lemma and palea.

1 species Mediterranean region, Madagascar and India, naturalized Australia, occurring in south-eastern Queensland.

1. ****Arundo donax* L.**

GIANT REED

Robust perennial up to 6 m tall; culms usually massed, arising from thick knotty rhizomes. Ligules truncate with ciliolate margin and longer tuft of hairs at each end, 1.5–3 mm long; leaf blades linear to narrowly triangular, attenuate, 5–70 cm \times 0.4–7 cm, smooth except for scabrous margin. Panicles showy, erect, barely exerted from uppermost leaf sheath, 30–70 cm long, branchlets clustered along rachis, flexuose; glumes acuminate, subequal, 1–1.2 cm long, 3- or rarely 4- or 5-nerved, glabrous; lemmas aristate, 0.8–1 cm long, lowest up to 1.3 cm long, point 1–3 mm long, 3–7-nerved, with long silky hairs on base and lower $\frac{1}{4}$ – $\frac{1}{3}$ of back. **Fig. 22A.**

Native of Mediterranean, Madagascar and India, introduced as cultivated ornamental; sparingly naturalized mainly in the Moreton district, usually on river or creek banks or swampy areas.

A. donax var. **versicolor** (Miller) Stokes, a horticultural form, has green and white longitudinally striped leaves.

38. PHRAGMITES Adans.

Aquatic or semi-aquatic perennials; rhizomes creeping; culms very tall. Ligules narrow ciliate membranous rims; leaf blades flat, deciduous. Inflorescences of large profusely branched dense panicles; spikelets solitary, pedicellate, silky pubescent, rachilla disarticulating between lemmas, florets 3-11, lowest male or sterile, remainder bisexual or uppermost ± reduced; glumes thin, rounded on back, 3-5-nerved; lemmas narrow, rounded or slightly keeled on back, glabrous, lowest lemma much longer than glumes, 3-7-nerved, ± persistent, fertile lemmas acuminate, 1-3-nerved; paleas *ca* half as long as lemmas, 2-keeled; stamens 3, or 2 in lowest floret; styles distinct, short, stigmas plumose. Caryopses oblong in outline, subterete, free from but loosely enclosed by lemma and palea.

3 species cosmopolitan; 2 species Australia; 1 species south-eastern Queensland.

1. **Phragmites australis** (Cav.) Trin. ex Steudel COMMON REED

Arundo australis Cav.; *Phragmites communis* Trin.; *P. vulgaris* (Lam.) Crep.

Robust perennial 1.5-3 m tall, with stout creeping rhizomes and stolons; culms erect, rigid, stout. Ligules a ciliate rim 0.5 mm long with a tuft of longer hairs at end; leaf blades linear-ovate, attenuate, 10-60 cm × 0.5-3.5 cm, smooth. Panicles dense, slightly nodding, 15-40 cm long; rachilla with long silky hairs; glumes acuminate, unequal, lower 3-6 mm long, upper 7-9 mm long, both 3-nerved; lowest lemma acute, broader than others, 1.2-1.4 mm long, remainder with very long narrow point, 1.1-1.3 mm long, 3-nerved. **Fig. 22B.**

Recorded from all districts of the region, in or near creeks or swamps.

39. DANTHONIA DC.

Tufted perennials. Ligules reduced to ciliate rim; leaf blades usually narrow, folded in bud, flat or convolute at maturity. Inflorescences of open to spike-like contracted panicles with few spikelets; spikelets pedicellate, rachilla disarticulating obliquely above glumes and between lemmas, florets 3-9, bisexual or uppermost male or sterile; glumes acute, subequal, longer than lemmas, broad, keeled, faintly 5-7-nerved; lemmas bilobed, awned, rounded on back, variously pubescent, awn arising from sinus between lobes, reflexed or geniculate and usually twisted; paleas as long as or longer than entire part of lemmas, apex entire or bifid, 2-keeled, keels usually ciliate; callus bearded; stamens 3; ovary glabrous, styles 2, distinct, stigmas plumose. Caryopses loosely embraced by, but free from, lemma and palea.

About 110 species tropical and temperate, especially South Africa and Australia; 33 species Australia; 5 species south-eastern Queensland.

- | | |
|--|-------------------------|
| 1. Glumes acute to erosely truncate; lemmas with hairs in marginal and dorsal tufts as well as all over base | 1. <i>D. racemosa</i> |
| Glumes acuminate to attenuate; lemmas with hairs all over back or also on transverse row just below sinus | 2 |
| 2. Lemmas with hairs in 2 distinct rows, one basal, one just below sinus | 2. <i>D. tenuior</i> |
| Lemmas with hairs all over back, often with longer hairs just below sinus as well | 3 |
| 3. Lemmas 1.1-1.4 cm long; awns <i>ca</i> 0.7-1.1 cm long, initially straight, at length sharply bent above sinus, not or rarely twisted <i>ca</i> 1-1.5 mm above base | 3. <i>D. linkii</i> |
| Lemmas 0.5-1.2 cm long; awns 0.7-1 cm long and twisted for lower 2-3 mm, or 0.9-1.8 cm long and twisted for lower 4-6 mm | 4 |
| 4. Glumes 0.8-1.5 cm long; awns 0.7-1 cm long, loosely twisted for lower 2-3 mm | 4. <i>D. longifolia</i> |
| Glumes 1.4-1.9 cm long; awns 0.9-1.8 cm long, strongly twisted for lower 4-6 mm | 5. <i>D. induta</i> |

1. *Danthonia racemosa* R. Br.

Danthonia racemosa var. *biaristata* Benth.; *D. penicillata* F. Muell.; *D. penicillata* var. *racemosa* (R. Br.) Maiden & Betche; *Notodanthonia racemosa* (R. Br.) Zotov; *Rytidosperma racemosum* (R. Br.) Connor & Edgar

Erect slender tufted perennial up to 60 cm tall. Ligules reduced to cilia *ca* 0.25 mm long; leaf blades usually closely inrolled, attenuate, 5–15 cm long, sparsely to rarely densely pilose with tubercular-based hairs on outer surface, minutely scabrous on inner. Panicles linear to slightly branched in lower part, 5–15 cm long; spikelets with 6–10 florets, florets cohering in a semi-cylindrical mass; glumes acute or erosely truncate, subequal or irregularly unequal, 0.7–1.6 cm long, glabrous, minutely scabrous; lemmas aristate, or truncate or shortly abruptly and obliquely acuminate, 0.5–1.1 cm long depending mainly on length of points, pubescent at base, and in marginal and sometimes dorsal tufts, awn 0.7–1.4 cm long, twisted in lower part for *ca* 2–3 mm.

Two varieties occur in the region:

- | | |
|---|---|
| 1. Lemma lobes long aristate, 2 mm or more long | <i>D. racemosa</i> var. <i>racemosa</i> |
| Lemma lobes truncate or very shortly and obliquely pointed, point less than 1 mm long | <i>D. racemosa</i> var. <i>obtusata</i> |

D. racemosa var. *racemosa* has been recorded from southern Moreton and Darling Downs districts while *D. racemosa* var. *obtusata* F. Muell. ex Benth. (*D. racemosa* var. *multiflora* Benth.; *Rytidosperma racemosum* var. *obtusatum* (Benth.) Connor) (Fig. 22C.) has been recorded from the Darling Downs district.

2. *Danthonia tenuior* (Steudel) Conert

Plinthanthesis tenuior Steudel; *Danthonia purpurascens* Vickery; *Notodanthonia tenuior* (Steudel) S. T. Blake; *Rytidosperma tenuius* (Steudel) Connor & Edgar

Erect tufted perennial up to 90 cm tall. Ligules shortly ciliate with long hairs at margins and on collar; leaf blades flat at least at base, or becoming loosely inrolled, attenuate, 3–20 cm \times 0.1–0.3 cm, glabrous to distinctly hirsute. Panicles loose or somewhat contracted, 5–20 cm long; spikelets with 4–6 florets; glumes attenuate, irregularly subequal, 1–1.7 cm long, minutely scabrous; lemmas aristate, 0.7–1.2 mm long, hairs in 2 rows, at base and just below sinus, awn 0.9–1.3 cm long, twisted in lower part once or twice 2–3 mm from base.

Recorded from Moreton, Darling Downs and Burnett districts.

3. *Danthonia linkii* Kunth

Avena bipartita Link; *Danthonia pallida* R. Br. var. *subracemosa* Benth. in part; *D. semiannularis* R. Br. var. *browniana* Domin in part; *Rytidosperma linkii* (Kunth) Connor & Edgar

Erect densely tufted perennial up to 70 cm tall. Ligules often with tuft of longer hairs at each end; leaf blades linear, attenuate to subulate, 20–30 cm \times 0.1–0.25 cm, glabrous to very sparsely pubescent, scabrous on margins. Panicles rather narrow, 4–12 cm long; spikelets with *ca* 6 florets; glumes acuminate, subequal, 0.8–1.7 cm long, glabrous, smooth; lemmas aristate, 1.1–1.4 cm long, pubescent all over back with longer silky hairs arising from back below sinus, awn geniculate, *ca* 0.7–1.1 cm long, initially straight, at length sharply bent above sinus, not or rarely twisted *ca* 1–1.5 mm from base.

Recorded from Darling Downs district, McPherson Ra. in the Moreton district and Kingaroy area in the Burnett district.

4. *Danthonia longifolia* R. Br.

Avena longifolia (R. Br.) Sprengel; *Danthonia penicillata* F. Muell. non Beauv.; *D. penicillata* var. *longifolia* (R. Br.) Maiden & Betche; *Rytidosperma longifolium* (R. Br.) Connor & Edgar; *Notodanthonia longifolia* (R. Br.) Veldk.

Erect densely tufted perennial up to 75 cm tall. Hairs of ligule extremely reduced, 0.1–0.2 mm long or absent, without longer hairs at ends; leaf blades often flattened basally, inrolled and filiform towards apex, up to 35 cm \times 0.2 cm, minutely scabrous. Panicles contracted, 5–15 cm long; spikelets with usually 5 or 6 florets; glumes acuminate, subequal or lower slightly longer than upper, 0.8–1.5 cm long, glabrous, minutely scabrous; lemmas aristate, 0.5–1 cm long, pubescent all over back with longer

hairs in a transverse row just below sinus, awn delicate, 7–10 mm long, loosely twisted for lower 2–3 mm. **Fig. 22D.**

Mountains and ranges of southern Moreton district and southern and eastern Darling Downs district, often in rocky areas.

5. *Danthonia induta* Vickery

Rytidosperma indutum (Vickery) Connor & Edgar; *Notodanthonia induta* (Vickery) Veldk.

Robust tufted perennial up to 1.2 m tall. Ligules often with tuft of longer hairs at each side; leaf blades flat to loosely inrolled, linear-subulate, 4–30 cm × 0.1–0.4 cm, glabrous, sometimes minutely scabrous. Panicles loosely spreading, 9–18 cm long; spikelets with mostly 3 florets; glumes acuminate, subequal, 1.4–1.9 cm long, glabrous, very minutely scabrous; lemmas aristate, 0.7–1.2 cm long with long silky hairs arising from near base and a transverse row just below sinus, awn 0.9–1.8 cm long, twisted in lower part for *ca* 4–6 mm.

Recorded from southern Moreton district on steep or rocky hillsides in eucalypt open forest.

40. MONACHATHER Steudel

Erect tufted perennials. Ligules membranous, often ciliate. Inflorescences of sparse contracted panicles; spikelets pedicellate, rachilla disarticulating transversely above glume and between lemmas, florets usually 5 or 6; glumes rounded on back, 11–13-nerved; lemmas very deeply lobed, body subglobose or broadly turbinate, much hardened, zone of long hairs below lobes, awn arising from sinus, weakly twisted, *ca* as long as lobes; paleas 2-keeled; callus hairy; stamens 3; styles 2, stigmas plumose. Caryopses subquadrate in outline.

1 species endemic in Australia, occurring in south-eastern Queensland.

1. *Monachather paradoxa* Steudel

BANDICOOT GRASS; MULGA OATS

Danthonia bipartita F. Muell.

Erect or sometimes geniculate perennial, bulbous base covered with scale-like sheaths bearing dense woolly hairs. Ligules truncate-laciniate, often ciliate, 1–3 mm long; leaf blades linear, ± flat, attenuate, 4–20 cm × 0.1–0.4 cm, generally sprinkled with long white hairs, minutely scabrous. Panicles linear, 5–15 cm long, spikelets few, florets 3–8; glumes acuminate, subequal or lower glume slightly longer, (0.8–)1.1–1.4(–1.7) cm long, glabrous, minutely scabrous; lemmas acute or tapered, 1–1.3 cm long, silky hairy ± at base, and a transverse row just below sinus, awn 7–9 mm long, slightly twisted at base.

Fig. 22E.

Recorded from drier areas of Darling Downs district. Valued native forage grass.

41. AMPHIPOGON R.Br.

Tufted perennials. Ligules a fringe of hairs; leaf blades narrow, stiff, convolute, pointed. Inflorescences of short dense spike-like panicles; spikelets solitary, pedicellate or sessile, rachilla disarticulating above glumes, floret 1, bisexual, lower spikelets sometimes sterile; glumes subequal, firm, not keeled, 3-nerved; lemma closed around palea, deeply 3-lobed, lobes tapered into scabrid or ciliate awn-like bristles, membranous margins often forming additional delicate lateral lobes, 3-nerved, pubescent on nerves, palea ± equal to lemma, 2-lobed, lobes tapering into awn-like bristles; stamens 3; ovary glabrous, styles united towards base or in lower half. Caryopses cylindrical-turbinate or oblong in outline, enclosed by but free from lemma and palea.

7 species endemic in Australia; 2 species south-eastern Queensland.

1. Bristles on lemmas ciliate, cilia decreasing in size from base to tips
Bristles on lemmas scabrous, without cilia decreasing in size from base to tip

1. *A. strictus*
2. *A. caricinus* var. *scaber*

1. *Amphipogon strictus* R. Br.**GREYBEARD GRASS**

Aegopogon strictus (R. Br.) Beauv.; *Amphipogon brownii* F. Muell.; *Amphipogon elatior* Gandoger; *Amphipogon imbricatus* Gandoger; *Amphipogon pinifolius* Mez.

Erect perennial, usually 25–35 cm tall; culms arising singly at close intervals from contracted horizontal rhizome. Ligules ciliate; leaf blades stiff, infolded, finely pointed, 1–5(–15) cm long, glabrous. Panicles spike-like, rather dense, 1–2(–3) cm long; glumes acute, lower slightly shorter than upper, lower 4–7 mm long, upper 5–8 mm long, minutely scabrous; lemma ca 0.8–1.2 cm long, body hardened with 2 dorsal vertical bands of silky appressed hairs, lobes aristate, ciliate, cilia becoming smaller towards scabrous tips. **Fig. 22F.**

Recorded from the Stanthorpe-Wallangarra area of the Darling Downs district.

2. *Amphipogon caricinus* F. Muell. var. *scaber* Vickery **LONG GREYBEARD GRASS**

Erect tufted or compactly rhizomatous perennial, usually 20–50 cm tall; scales at base of culms often \pm pubescent. Ligules shortly ciliate; leaf blades convolute, finely pointed, 2–15 cm long, occasionally sparsely hirsute. Panicles spike-like, rather dense, 1.5–5 cm long; glumes acute, \pm equal, 4–5 mm long, minutely scabrous, almost always with coarse tubercular-based hairs near margins and apex; lemma ca 6–8 mm long, body hardened, silky appressed hairs usually \pm uniformly covering dorsal region below lobes, lobes aristate, scabrous, not or only very minutely ciliate.

Recorded from northern Darling Downs and Burnett districts, e.g. Miles, Barakula areas, Mundubbera area, though the type is recorded as collected from Stanthorpe area.

A. caricinus var. **caricinus** and **A. caricinus** var. **sericeus** Vickery can be distinguished from the above by being ciliate on the lemma lobes, the cilia long and not decreasing in size from base to tip. All are found in more western districts and may possibly be found in the westernmost part of the region.

42. ELYTROPHORUS Beauv.

Tufted annuals. Ligules membranous; leaf blades linear, flaccid. Inflorescences of spikes or spike-like panicles, spikelets in dense globular clusters along a simple or sometimes branched axis; rachilla disarticulating above glumes and between lemmas, florets 3–6; glumes acuminate, keeled, 1-nerved; lemmas acuminate, awned, scabrous ciliate on margins and awn, 3-nerved; paleas shorter than lemmas, membranous, winged on keels, apex bifid; stamens 1–3; ovary glabrous, styles 2, distinct, stigmas plumose. Caryopses obliquely oblong in outline, not compressed, free from lemma and palea.

4 species tropical Africa, tropical Asia, Australia; 1 species Australia, occurring in south-eastern Queensland.

1. *Elytrophorus spicatus* (Willd.) A. Camus**SPIKEGRASS**

Dactylis spicata Willd.; *Elytrophorus articulatus* Beauv.

Tufted annual usually 10–25(–40) cm tall. Ligules erosely truncate, 0.5 mm long; leaf blades linear, flat, attenuate, 5–27 cm \times 0.2–0.5 cm, smooth. Spikes interrupted or \pm continuous, up to 30 cm long; glumes acuminate, subequal, 2–3 mm long, margin membranous, minutely hispid; lemmas similar in length to glumes, aristate, 2.5–3.5 mm long, more rigid and broader than glumes, \pm keeled. **Fig. 22G.**

Far western dry areas of Darling Downs district, often on clay soils subject to seasonal flooding.

43. TRIRAPHIS R. Br.

Annuals or perennials. Ligules a ciliate membranous rim; leaf blades narrow. Inflorescences of open or contracted sometimes spiciform panicles; spikelets solitary, pedicellate, laterally compressed, rachilla disarticulating above glumes and between lemmas, florets 4–12, well exerted from glumes; glumes narrow, mostly bidentate and aristulate, subequal, 1-nerved; lemmas rounded on back, scarious-membranous, 3-nerved, 3-lobed and 3-awned, central lobe bifid and awned from sinus, laterals asymmetrical and

awned from inner side, awns slender, straight; paleas linear, slightly shorter than lemmas; stamens 3; ovary glabrous, styles slender, distinct, stigmas very slender, plumose. Caryopses linear in outline, terete or obtusely trigonous, tightly embraced by scarcely enlarged lemma and palea.

6 species tropical Africa and Australia; 1 species Australia, occurring in south-eastern Queensland.

1. *Triraphis mollis* R. Br. PURPLE PLUMEGRASS; NEEDLE GRASS
Slender tufted perennial up to ca 60 cm tall, though often much smaller; culms often purple coloured towards base. Ligule cilia 0.5–1 mm long; leaf blades linear, attenuate, up to 50 cm × 0.2 cm, minutely scabrous. Panicles narrow, spiciform, interrupted in lower part or continuous, 6–25 cm long; glumes attenuate, 3.5–5 mm long, glabrous; lemmas 3–4.5 mm long, lowest one longest, margins and back of keel hirsute, awns stiff, 4.5–8 mm long. **Fig. 22H.**

Widespread in drier parts of Moreton, Darling Downs and Burnett districts; uncommon. Can be poisonous to hungry animals under certain conditions.

44. ERIACHNE R. Br.

Tufted perennials or annuals. Ligules of a fringe of hairs; leaf blades flat or convolute. Inflorescences of loose or contracted panicles; spikelets solitary, pedicellate, rachilla disarticulating above glumes and between lemmas, florets 2, bisexual; glumes acute, equal, rounded dorsally, membranous to scarious, 7–11-nerved; lemmas subequal to or longer than glumes, leathery or membranous, 5–11-nerved, pubescent dorsally at least towards base, awnless or with simple terminal awn; paleas leathery to scarious, obtusely 2-keeled, entire or bifid, margin usually tightly enclosed by lemma margin; stamens 3 or 2; ovary glabrous, styles distinct, stigmas elongated, plumose. Caryopses obovoid to obloid, compressed, free from lemma and palea.

40 species China, Indomalaysia, Australia; ca 35 species Australia; 7 species south-eastern Queensland.

Species of **Eriachne** are generally called WANDERRIE GRASS.

1. Lemmas distinctly awned, awn 4 mm or more long	2
Lemmas not awned or mucronate, mucro less than 1 mm long	5
2. Paleas with 2 awns 0.7–1.4 cm long, nearly as long as lemma awn	1. <i>E. trisetata</i>
Paleas with 2 awns up to 4 mm long, much shorter than lemma awn, or awnless	3
3. Awns curved, 1.2–2.7 cm long, at least twice as long as glumes	2. <i>E. rara</i>
Awns straight, 0.4–0.7 cm long, as long as or up to twice as long as glumes	4
4. Glumes 2–3.5 mm long; palea awnless	3. <i>E. anomala</i>
Glumes 5–6 mm long; palea with 2 awns 0.5–3 mm long, not connate	4. <i>E. pallescens</i>
5. Lemmas with tangled spreading long coarse hairs on lower half; glumes gaping at maturity	5. <i>E. mucronata</i>
Lemmas with fine appressed hairs over most of back; glumes not gaping at maturity	6
6. Lemmas 2.5–4.5 mm long, up to 0.5 mm longer than glumes; panicles open, branchlets long, filiform	6. <i>E. insularis</i>
Lemmas 3–5.2 mm long, 0.5–1.2 mm longer than glumes; panicles usually contracted, branchlets short, stiff	7. <i>E. glabrata</i>

1. *Eriachne trisetata* Nees

Tufted perennial up to ca 1 m tall. Ligule cilia minute, often with few longer hairs at each end; leaf blades inrolled, attenuate, 3–20 cm × 0.1–0.2 cm, occasionally with scattered hairs. Panicles open, branchlets slender, ascending; glumes acuminate to attenuate, 0.6–1(–1.2) cm long, glabrous, sometimes very minutely scabrous; lemmas

4–5.5(–6) mm long, densely appressed pubescent, awn 0.8–1.2(–1.6) cm long; palea with 2 awns 0.7–1(–1.4) cm long, only slightly shorter than lemma awn, free. **Fig. 22I.**

Recorded from "Surfers Paradise" south of Southport, before extensive residential development or mining there; possibly no longer to be found in the region.

2. *Eriachne rara* R. Br.

Tufted usually pilose perennial up to 75 cm tall. Ligule cilia *ca* 0.5 mm long, usually a few longer hairs at each end; leaf blades linear, inrolled or infolded, attenuate, 4–20 cm \times 0.1–0.3 cm, minutely scabrous on inside, usually with coarse tubercular-based hairs outside. Panicles eventually open, branchlets often short, ascending; glumes acuminate, upper *ca* 0.5 mm shorter than lower, 5–9 mm long, with coarse tubercular-based hairs on or near margins, otherwise smooth; lemma 4–5.5 mm long, coarsely densely pubescent, awn 1.2–2.7 cm long, curved; palea with 2 awns 1.5–4 mm long, united for $\frac{1}{3}$ to nearly all their length.

Mainly Moreton and Wide Bay districts in poor sandy soils but also northern Darling Downs and Burnett districts in sandy or lateritic areas.

3. *Eriachne anomala* Hartley

Slender tufted perennial up to 80 cm tall. Ligule cilia minute; leaf blades linear, inrolled, 4–20 cm \times 0.1–0.15 cm, smooth or slightly minutely scabrous. Panicles open, branchlets slender, ascending; glumes blunt or mucronulate, 2–3.5 mm long, often minutely pubescent on back; lemmas 2.5–3.5 mm long, pubescent on back, awn 4–7 mm long; palea awnless.

Moreton and Wide Bay districts, in sand or sandy soils close to the sea.

4. *Eriachne pallescens* R. Br.

Erect tufted perennial up to 80 cm tall. Ligule cilia *ca* 0.5 mm long with tuft of longer hairs at each end; leaf blades linear, usually inrolled, attenuate, 3–20 cm \times 0.1–0.3 cm, minutely scabrous. Panicles open, branchlets slender, \pm erect or ascending; glumes acuminate, 5–6 mm long, minutely scabrous; lemmas 4–5 mm long, pubescent on back, awn 4–6.5 mm long; palea with 2 awns 0.5–1.5(–3) mm long, free from each other.

Moreton, Wide Bay and Burnett districts, usually in poor sandy soils or on rocky ridges.

5. *Eriachne mucronata* R. Br.

Slender tufted wiry perennial up to 60 cm tall. Ligule cilia *ca* 0.5 mm long, sometimes few slightly longer hairs at sides; leaf blades infolded, linear, stiff, rather pungent pointed, 1–4 cm \times 0.1–0.2 cm, minutely scabrous, sometimes with scattered coarse tubercular-based hairs. Panicles rather contracted, branchlets short; glumes gaping widely at maturity, acute or blunt, mucronate, 3–5.5 mm long, minutely scabrous, occasionally with few hairs on back towards base; lemmas *ca* 1 mm longer than glumes, 4–6.5 mm long, with spreading long coarse hairs on lower half, unawned or point up to 0.75 mm long; palea unawned. **Fig. 22J.**

Darling Downs and Burnett districts, in sandy or stony soils, e.g. Tara area, Miles-Chinchilla-Barakula area, Mundubbera area.

6. *Eriachne insularis* Domin

Slender tufted perennial up to 75 cm tall. Ligule cilia *ca* 0.5 mm long often with longer hairs at each end; leaf blades linear, inrolled, attenuate, 3–15 cm \times 0.1–0.2 cm, minutely scabrous. Panicles open, branchlets long filiform; glumes acute or obtuse, 2–4 mm long, glabrous, minutely scabrous; lemmas up to 0.5 mm longer than glumes, 2.5–4.5 mm long, \pm appressed pubescent, unawned or with short point up to 0.75 mm long; palea unawned.

Recorded from Stradbroke I. and Fraser I., on sand, an understorey grass in open forest.

7. *Eriachne glabrata* (Maiden) Hartley

Eriachne obtusa R. Br. var. *glabrata* Maiden

Slender tufted perennial up to 50 cm tall. Ligule cilia *ca* 0.5 mm long often with longer hairs at each end; leaf blades linear, inrolled, attenuate, 2–10 cm \times *ca* 0.1 cm, minutely scabrous, often with long hairs on inner side. Panicles open or somewhat contracted,



Fig. 22 POACEAE — A *Arundo donax*, part inflorescence x 2; B *Phragmites australis*, spikelet x 2; C–D *Danthonia* spp. — C *D. racemosa* var. *obtusata*, spikelet x 3; D *D. longifolia*, spikelet x 3; E *Monachather paradoxa*, spikelet x 3; F *Amphipogon strictus*, spikelet x 3; G *Elytrophorus spicatus*, inflorescence x 1; H *Triraphis mollis*, spikelet showing 3-awned lemmas x 6; I–K *Eriachne* spp. — I *E. trisetata*, showing 1-awned lemmas and 2-awned paleas x 3; J *E. mucronata*, spikelet with mucronate lemmas x 3; K *E. glabrata*, part inflorescence showing short stiff branchlets x 1; L *Micraira subulifolia*, habit x 1.

branchlets short, stiff; glumes acute or obtuse, 2–4.2 mm long, glabrous, minutely scabrous; lemmas 0.5–1.2 mm longer than glumes, 3–5.2 mm long, \pm appressed pubescent to appressed puberulent, unawned, acute; palea unawned. **Fig. 22K.**

Moreton and Wide Bay districts, on wallum areas on sandy soil, or occasionally in open forest.

45. *MICRAIRA* F. Muell.

Compact mat forming perennials, often with prop roots; culms densely covered with leaf sheaths. Leaves spirally arranged; ligules usually ciliate; blades narrow, disarticulating, sometimes pungent. Inflorescences of contracted panicles or compact spikes, arising from within tufts of leaves on short intravaginal branches; spikelets few, laterally compressed, rachilla disarticulating above glumes and between florets, florets 2, bisexual; glumes \pm equal, membranous, strongly keeled, 1–5-nerved; lemmas obtuse to truncate, entire or minutely 2-lobed, subequal, thinly membranous, 1–9-nerved, glabrous, smooth; paleas similar to lemmas, 2-keeled, 2–7-nerved; stamens 2; ovary glabrous, styles basally united, stigmas plumose. Caryopses ellipsoid or \pm obovoid, slightly compressed, enclosed by unaltered lemma and palea.

13 species endemic in Australia; 1 species south-eastern Queensland.

1. *Micraira subulifolia* F. Muell.

Mat forming perennial with prop roots, mats up to 1 m diameter; culms 6–8 cm tall from trailing stems. Ligules ciliate with white hairs up to 0.4 mm long, sometimes \pm glabrous; leaf blades very narrowly oblong, flat or inrolled towards apex, rigid, acute, 0.5–1(–1.5) cm \times 0.03–0.1 cm, 7-nerved, minutely scabrous, sometimes sparsely pilose with simple or tubercular-based hairs. Panicles contracted, 0.7–1.5 cm long; glumes ovate, acute or blunt, 0.75–1 mm long, \pm glabrous; lemmas obovate, \pm truncate, 1–1.25 mm long, 6–9-nerved, glabrous. **Fig. 22L.**

Recorded from Glasshouse Mts in the Moreton district, at or near the summit rocky areas.

46. *ARISTIDA* L.

Annuals or perennials; culms terete or compressed, usually glabrous, often wiry. Ligules ciliate or a ciliate membrane; leaf blades usually conduplicate or convolute. Panicles open or contracted, sometimes spiciform; spikelets solitary, bisexual, rachilla disarticulating above glumes, floret 1; glumes membranous, entire, emarginate, muticous or awned, keeled, 1–few-nerved, usually glabrous, lower deciduous, often caducous, upper persistent; lemma convolute or involute, entire or emarginate, 3-nerved, with basal callus and terminal trifid awn, with or without spirally twisted usually scabrous column between lemma and awns, awns scabrous, sometimes laterals reduced or absent; palea hyaline, much shorter than lemma, 2-keeled; stamens 3 or 1; ovary glabrous, styles free, short.

330 species tropical and subtropical; ca 60 species Australia; 25 species south-eastern Queensland.

Species of *Aristida* are commonly called WIREGRASS and the awned spikelets can sometimes cause mechanical injury to stock.

- | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|------------------------|---|
| 1. Lateral awns less than $\frac{1}{3}$ as long as central awn and bristle-like, or absent | . | . | . | . | . | . | . | . | . | 2 |
| Lateral awns at least $\frac{1}{3}$ as to as long as central awn | . | . | . | . | . | . | . | . | . | 3 |
| 2. Lower internodes pubescent or villous; leaf blades flat | . | . | . | . | . | . | . | . | 1. <i>A. utilis</i> | |
| Lower internodes glabrous; leaf blades setaceous | . | . | . | . | . | . | . | . | 2. <i>A. spuria</i> | |
| 3. Lemmas with an articulation | . | . | . | . | . | . | . | . | . | 4 |
| Lemmas without an articulation | . | . | . | . | . | . | . | . | . | 5 |
| 4. Lemmas brownish when mature, 5–7 mm long; column 1–1.5(–2.5) cm long; culms \pm wavy | . | . | . | . | . | . | . | . | 3. <i>A. contorta</i> | |
| Lemmas mottled purple when mature, 7–10 mm long; column 1.5–5 cm long; culms \pm straight | . | . | . | . | . | . | . | . | 4. <i>A. holathera</i> | |

5. Lemmas involute, with a furrow on ventral surface	6
Lemmas convolute, without a furrow on ventral surface	18
6. Columns present	5. <i>A. pernicioso</i>
Columns absent	7
7. Awns unequal in length, laterals $\frac{1}{3}$ – $\frac{2}{3}$ as long as central awn	6. <i>A. queenslandica</i>
Awns \pm equal in length or laterals at least $\frac{2}{3}$ length of central awn	8
8. Margins of lemma furrow with 1–several rows of tubercles or short spines or muricate towards apex of lemma	9
Margins of lemma furrow without rows of tubercles or short spines, \pm smooth	13
9. Upper glumes shorter than lower glumes	10
Upper glumes longer than lower glumes or glumes \pm equal	12
10. Inflorescences with pulvini; glumes \pm smooth, (0.8–)1–1.4 cm long; lemmas 0.8–1.2 cm long	7. <i>A. calycina</i>
Inflorescences without pulvini; glumes \pm minutely scabrous, 0.5–0.9(–1.2) cm long; lemmas 0.5–0.9 cm long	11
11. Inflorescence branches with spikelets at base; lateral awns shorter than central by 1–2 mm	8. <i>A. jerichoensis</i>
Inflorescence branches without spikelets at base; lateral awns shorter than central awn by more than 2 mm	9. <i>A. benthamii</i>
12. Lemmas 0.4–0.7 cm long	8. <i>A. jerichoensis</i>
Lemmas 0.7–1.2 cm long	10. <i>A. muricata</i>
13. Lemmas with pseudo-articulation	11. <i>A. sciuroides</i>
Lemmas without pseudo-articulation	14
14. Lemma margin distinctly protruding laterally from the ventral furrow	12. <i>A. lazaridis</i>
Lemma margin not protruding or if so, not distinctly	15
15. Lateral awns shorter than central one by 1–2 mm	8. <i>A. jerichoensis</i>
Lateral awns shorter than central one by more than 2 mm	16
16. Lemmas 3.5–5.5(–7) mm long	9. <i>A. benthamii</i>
Lemmas more than 6 mm long	17
17. Glumes acute or obtuse; inflorescence branches with spikelets from or from near base	7. <i>A. calycina</i>
Glumes acuminate to awned; inflorescence branches without spikelets in lower half	13. <i>A. acuta</i>
18. Lemmas with twisted columns	19
Lemmas without columns	20
19. Lower glumes 3–7-nerved	14. <i>A. warburgii</i>
Lower glumes 1-nerved	15. <i>A. latifolia</i>
20. Lemmas extended beyond both glumes	21
Lemmas not extended beyond both glumes	27
21. Panicles cylindrical to ovate in outline, 2–5 cm long, branches very short with prominent pulvini	16. <i>A. caput-medusae</i>
Panicles not as above, more than 5 cm long	22
22. Culms bushy with many fine branches; leaf blades very fine and finely pointed	17. <i>A. gracilipes</i>
Culms not bushy, if much-branched then robust, otherwise slender and few branched; leaf blades not as above	23
23. Glumes acute or obtuse-mucronate	24
Glumes prominently aristulate	25

- | | | |
|--|------------------------------|----|
| 24. Inflorescences with few distant branches, divaricate to horizontally spreading; lateral awns 0.5–1.1 cm long | 18. <i>A. vagans</i> | |
| Inflorescences not as above; lateral awns 1–1.3(–2.5) cm long | 19. <i>A. ramosa</i> | |
| 25. Lemmas scabrid-tuberculate; culms very robust | 20. <i>A. lignosa</i> | |
| Lemmas scabrous only on margin apically; culms slender to robust | | 26 |
| 26. Culms 25–50 cm tall; inflorescences 5–8 cm long | 21. <i>A. leichhardtiana</i> | |
| Culms more than 60 cm tall; inflorescences 8–30 cm long | 19. <i>A. ramosa</i> | |
| 27. Lemmas shorter than or \pm equal in length to upper glume | | 28 |
| Lemmas shorter than or \pm equal in length to lower glume | | 31 |
| 28. Upper glumes more than 1.2 cm long | | 29 |
| Upper glumes less than 1.2 cm long | | 30 |
| 29. Panicles 14–25 cm long, only 1 or 2 terminal spikelets per branch | 22. <i>A. leptopoda</i> | |
| Panicles 7–15 cm long, few–several spikelets along each branch | 23. <i>A. obscura</i> | |
| 30. Panicles 5–8 cm long, without spikelets in lower part | 21. <i>A. leichhardtiana</i> | |
| Panicles 8–30 cm long, usually with spikelets from base | 19. <i>A. ramosa</i> | |
| 31. Glumes 0.45–0.7 cm long; lemmas 5–6 mm long | 24. <i>A. platychaeta</i> | |
| Glumes 0.7–1.5 cm long; lemmas 7–10 mm long | 25. <i>A. blakei</i> | |

1. *Aristida utilis* F. M. Bailey

Streptachne stipoides R. Br.; *Stipa streptachne* F. Muell.; *Aristida streptachne* Domin
Perennial 35–90 cm tall, forming compact tufts; culms thin, simple or sparsely branched, lower internodes densely pilose to villous, upper glabrous. Leaf sheaths glabrous or pilose, scabrous; ligules less than 0.5 mm long; blades involute-conduplicate or convolute, soon becoming flat and coiled or flexuose, attenuate, 7–20 cm \times 0.1–0.2 cm, scabrous. Panicles loose, rather sparse, usually 20–30 cm long; glumes very narrowly ovate, long acuminate or aristulate, usually entire, rarely notched, \pm equal or lower glume longer, lower 0.8–1.3 cm long, usually minutely scabrous, upper 0.8–1.2 cm long, usually smooth; lemma linear-elliptic, 0.6–1.3 cm long, tuberculate-spiny in upper $\frac{1}{3}$ to almost smooth, column 5–10 mm long, awns dissimilar, middle one geniculate, 0.9–2 cm long, laterals \pm equal, bristle-like, 0.5–7(–10) mm long or 1 or both absent.

Recorded from the Burnett district on shallow soils.

2. *Aristida spuria* Domin

Slender annual or short-lived perennial 20–60 cm tall, forming compact tufts; culms thin, branched, usually fastigiate, few-noded. Leaf sheaths glabrous or pilose; ligules less than 0.5 mm long; blades involute-conduplicate, setaceous, 3–20 cm \times 0.1–0.15 cm, strongly striate, flexuose, usually scabrous. Panicles contracted, loose, 12–30 cm long, branches distant, without spikelets in lower part; glumes very narrowly ovate, acuminate, \pm equal, 0.6–1.1 cm long, glabrous or rarely sparsely pilose, lower usually minutely scabrous, upper notched or 2-lobed, usually smooth; lemma pale, linear-elliptic, 0.6–0.9(–1.3) cm long, minutely scabrous near apex, column 0.4–0.8(–1.1) cm long, awns dissimilar, middle one geniculate, 0.6–1.5(–2) cm long, laterals \pm equal, bristle-like, 0.5–5.5(–9) mm long, or sometimes absent. **Fig. 23A.**

Recorded from Wide Bay, Burnett and Moreton districts, usually on rocky mountains or hillsides, e.g. Mt Walsh, Mt Greville.

3. *Aristida contorta* F. Muell.

BUNCHED KEROSENE GRASS; WINDGRASS;
SILVERGRASS

Aristida arenaria Gaudich; *A. arenaria* var. *hirsuta* Henrard; *A. arenaria* var. *brevistipitata* Henrard; *A. contorta* var. *hirsuta* (Henrard) H. Eichler

Slender ephemeral or short-lived perennial 12–30 cm tall, forming compact tufts; culms thin, strongly branched. Leaf sheaths pilose or glabrous; ligules ca 0.5–1 mm long; blades convolute, filiform, finely pointed, 1.5–10 cm \times 0.05–0.1 cm, pilose or glabrous, scabrous, striate, flexuose or curly on drying. Panicles contracted, often nodding, up to

10 cm long; glumes very narrowly ovate, acuminate, 1-nerved, unequal, lower 0.8–1.3 cm long, upper emarginate or 2-lobed, cuspidate, 1.8–2.7 cm long; lemma brown, linear-elliptic, 5–7 mm long, muriculate towards apex, smooth below, articulation prominent, readily disarticulating, column usually 1–1.5(–2.5) cm long, awns capillary, \pm equal, 3–7 cm long. **Fig. 23B.**

Recorded from Darling Downs and Burnett districts on granite substrates; further west on sand or sandy loam.

4. *Aristida holathera* Domin ERECT KEROSENE GRASS; LARGE SILVERGRASS
Aristida stipoides R. Br.; *A. stipoides* var. *normalis* Domin; *A. browniana* Henrard; *A. stipoides* var. *brachyathera* Domin; *A. muelleri* Henrard

Annual or short-lived perennial usually 30–60 cm tall; culms simple, stiffly erect. Leaf sheaths striate; ligules up to 0.5 mm long; blades soon tightly conduplicate-convolute and setaceous, 4–25 cm \times 0.1–0.2 cm, scabrous, flexuose on drying. Panicles contracted, stiffly erect, usually 10–20 cm long; glumes very narrowly ovate, long acuminate from usually notched or 2-lobed apex, 1-nerved, unequal, lower 0.8–1.4 cm long, upper 1.5–2.5 cm long, sometimes minutely scabrous; lemma mottled purple, linear-elliptic, 7–10 mm long, articulation prominent, readily disarticulating, column 1.5–5 cm long, awns filiform, 3–8 cm long.

Darling Downs, Wide Bay and Moreton districts, in sand or sandy soil.

5. *Aristida pernicioso* Domin

Sprawling perennial 30–70 cm tall; culms simple or sparsely branched. Leaf sheaths strongly striate, pilose to hispid, or glabrous; ligules less than 0.5 mm long; blades at first involute-conduplicate, soon becoming flat and coiled or curly, 7–25 cm \times 0.2–0.3 cm, usually hispid. Panicles spiciform, continuous or interrupted, 15–32 cm long, branches very short; glumes linear-ovate, very long acuminate, \pm equal or upper slightly longer, 0.9–1.9 cm long, lower usually minutely scabrous, sometimes sparsely pilose, upper \pm smooth, usually sparsely pilose; lemma linear-elliptic, 0.8–1.4 cm long, minutely tubercular-scabrous in upper half, or almost smooth, column 3.5–8 mm long, awns filiform, usually divaricate, middle one 1.8–3.2 cm long, laterals 1.3–2.8 cm long.

Recorded from near Gayndah in the Burnett district.

6. *Aristida queenslandica* Henrard

Slender perennial 0.4–1.1 m tall; culms wiry, simple to fastigiate branched, lower internodes often delicately hirsute. Lower leaf sheaths often pilose to hirsute; ligules up to 0.5 mm long; blades conduplicate or \pm flat, tip capillary, 6–28 cm \times 0.1–0.2 cm, scabrous, often curly on drying. Panicles contracted, loose, interrupted, often nodding, branches filiform; glumes very narrowly ovate, equal or unequal, either one longer, lower acuminate, 0.5–1.2 cm long, minutely scabrous or smooth, upper entire or notched, abruptly acuminate, 0.5–1.1 cm long, usually smooth; lemma purple or pallid with darker spots, linear-elliptic, 6.5–10 mm long, awns stiff or filiform, dissimilar in length, middle one 0.8–1.8 cm long, laterals $\frac{1}{3}$ – $\frac{2}{3}$ as long, 0.3–1 cm long. **Fig. 23D.**

Two varieties occur in the region:

- | | | | | | | |
|--|---|---|---|---|---|------------------------------|
| 1. Culm internodes hirsute, especially at base | . | . | . | . | . | <i>A. queenslandica</i> var. |
| | | | | | | <i>queenslandica</i> |
| Culm internodes glabrous | . | . | . | . | . | <i>A. queenslandica</i> var. |
| | | | | | | <i>dissimilis</i> |

A. queenslandica var. **queenslandica** has been recorded from Moreton, Wide Bay and Darling Downs districts, often occurring on shallow soils on sandstone hills. **A. queenslandica** var. **dissimilis** (S. T. Blake) B. Simon (*A. dissimilis* S. T. Blake) has been recorded from mountains of the southern Moreton district, e.g. Mt Greville.

7. *Aristida calycina* R. Br.

DARK WIREGRASS

Perennial 0.4–1.3 m tall; culms wiry, strongly branched, nodes often thickened. Leaf sheaths smooth or minutely scabrous; ligules less than 0.5 mm long; blades convolute or conduplicate, or sometimes flat, 4–30 cm \times 0.1–0.3 cm, scabrous. Panicles contracted,

usually loose, continuous or interrupted, 12–21 cm long, branches finally divaricate, with prominent pulvini; glumes very narrowly ovate, equal or unequal, either one longer, lower acute to acuminate, 0.6–2 cm long, caducous, upper obtuse, entire or notched, mucronate, 0.6–1.8 cm long; lemma pale or purplish with darker spots, linear-elliptic, \pm smooth, 0.6–1.4 cm long, awns flattened, divergent, middle one 0.8–3 cm long, laterals thinner, 0.6–2.3 cm long.

Two varieties occur in the region:

- | | | |
|---|-----------|---|
| 1. Glumes 0.6–1.3 cm long; lemma furrow without tubercles | | <i>A. calycina</i> var. <i>calycina</i> |
| Glumes 1.3 cm or more long; lemma furrow with tubercles | | <i>A. calycina</i> var. <i>praealta</i> |

A. calycina var. *calycina* (*A. glumaris* Henrard) (Fig. 23C.) occurs throughout the region on sandy soil. *A. calycina* var. *praealta* Domin (*A. praealta* (Domin) Henrard; *A. armata* Henrard) has been recorded from Darling Downs, Burnett and Moreton districts.

8. *Aristida jerichoensis* (Domin) Henrard

JERICO WIREGRASS

Aristida ingrata Domin var. *jerichoensis* Domin

Compactly tufted perennial 20–100 cm tall; culms terete, usually branched, often glaucous or pruinose. Leaf sheaths \pm smooth; ligules 0.5–1 mm long; blades conduplicate or convolute, attenuate, 5–23 cm \times 0.1–0.3 cm, scabrous. Panicles contracted, rather dense, interrupted below or continuous, 4–27 cm long, branches bearing spikelets from axils; glumes narrowly oblong-ovate, equal or either up to *ca* 1 mm longer than other, 4–9 mm long, smooth or scabrous, lower acute cuspidate, upper obtuse mucronate, notched; lemma usually brown, linear-oblong, 4–7 mm long, muricate in furrow or smooth, awns flattened, filiform, stiffly divergent, middle one 1.2–2.5 cm long, laterals 1–2.2 cm long.

Two varieties occur in the region:

- | | | |
|---|-----------|---|
| 1. Margin of involute lemmas with rows of distinct short spines | | <i>A. jerichoensis</i> var. <i>subspinulifera</i> |
| Margin of involute lemmas without rows of distinct short spines | | <i>A. jerichoensis</i> var. <i>jerichoensis</i> |

Both *A. jerichoensis* var. *jerichoensis* and *A. jerichoensis* var. *subspinulifera* Henrard have been recorded from Burnett, Darling Downs and Moreton districts, usually on sandy or stony hard soils.

9. *Aristida benthamii* Henrard

Slender perennial 50–90 cm tall, forming compact tufts; culms thin, terete or compressed, simple or branched, becoming smooth. Leaf sheaths striate, scabrous, abruptly narrowed at junction with blade; ligules less than 0.5 mm long; blades flat to conduplicate and setaceous, 5–35 cm \times 0.1–0.3 cm, striate, scabrous, flexuose to curly. Panicles contracted and narrow, or loose to open, interrupted, 14–30 cm long, branches naked in lower part; glumes \pm equal or unequal with lower glume longer, linear-ovate, scabrous, lower long acuminate, 4.5–9 mm long, often caducous, upper obtuse or acute, entire or notched, mucronate, 4.5–7 mm long; lemma usually brown or purple, linear-elliptic, 3.5–7 mm long, minutely tuberculate on margins of furrow or smooth, awns filiform, middle one divergent, 0.8–1.5 cm long, laterals suberect, 0.5–1 cm long.

Two varieties occur in the region:

- | | | |
|--|-----------|---|
| 1. Margins of the lemma furrows with 1–several rows of tubercles | | <i>A. benthamii</i> var. <i>spinulifera</i> |
| Margins of the lemma furrows smooth or lemma muricate towards apex | | <i>A. benthamii</i> var. <i>benthamii</i> |

A. benthamii var. *benthamii* has been recorded from most of the region in open forest. *A. benthamii* var. *spinulifera* B. Simon has been recorded from the Moreton and Burnett districts, often in rocky areas.

10. *Aristida muricata* Henrard

Pruinose perennial 50–90 cm tall; culms simple or branched from lower nodes. Leaf sheaths glabrous, smooth; ligules *ca* 1 mm long; leaf blades flat in lower part or conduplicate, setaceous, 5–25 cm \times 0.1–0.2 cm, scabrous. Panicles contracted, interrupted in lower part or continuous, branches distant, loosely appressed to axis,

bearing spikelets \pm from base, glumes linear-ovate, equal or upper longer, lower acuminate, 0.6–1.2 cm long, upper entire or emarginate, obtuse or abruptly acuminate, 0.7–1.2 cm long; lemma cartilaginous, linear-elliptic, 0.7–1.2 cm long, densely covered with short bulbous curved spiny hairs in upper $\frac{1}{2}$ – $\frac{2}{3}$ on surface and in furrow, awns filiform, flattened in lower part, divergent, middle one 1.2–3 cm long, laterals 1–2.7 cm long.

Moreton and Darling Downs districts, on sand or sandy soil, usually in open forest.

11. *Aristida sciuroides* Domin

Robust tussock forming perennial 0.7–1.4(–2) m tall; culms often purple, branched. Leaf sheaths somewhat striate; ligules up to 0.5 mm long; blades convolute-conduplicate or sometimes flat, rarely flexuose or curly, attenuate, 6–32 cm \times 0.2–0.3 cm, scabrous above, often pilose towards ligule. Panicles loosely contracted to almost spiciform, usually interrupted in lower part, 30–60 cm long, branches appressed to axis or finally drooping; glumes very narrowly ovate, long acuminate, \pm equal or either slightly longer than the other, 1.1–1.7 cm long; lemma brown or purple, linear-elliptic, 0.9–1.3 cm long, smooth or with minute tubercles on upper part and in furrow, awns flattened, filiform, divergent or divaricate, middle one 1.5–3.6 cm long, laterals 1–3 cm long. **Fig. 23E.**

Recorded from the Darling Downs district.

12. *Aristida lazaridis* B. Simon

Slender ?perennial 0.4–0.8(–1.4) m tall; culms terete, usually fastigiate at nodes. Leaf sheaths smooth or minutely scabrous; ligules *ca* 0.5 mm long; blades conduplicate-convolute, attenuate, 5–25 cm \times 0.1–0.3 cm, scabrous. Panicles loose, open, 10–45 cm long, branches capillary, naked in lower half; glumes linear-ovate, \pm equal or lower longer than upper, lower long acuminate, 0.8–2 cm long, upper notched, aristulate, 0.6–1.5 cm long; lemma pallid usually mottled purple, linear-elliptic, 0.8–1.2 cm long, involute with 1 margin usually protruding laterally, giving a convolute appearance, \pm smooth, awns filiform to slightly flattened, suberect to divergent, middle one 1–2.8(–4.5) cm long, laterals 0.8–2.2(–3.2) cm long. **Fig. 23F.**

Burnett district, on shallow rocky soils, usually in open forest.

13. *Aristida acuta* S. T. Blake

Perennial 0.4–1.25 m tall; culms thin, usually terete, branched from lower nodes, smooth. Leaf sheaths strongly striate, minutely scabrous or smooth, glabrous; ligules up to 0.5 mm long; leaf blades usually convolute and setaceous, 5–16 cm \times 0.2–0.3 cm, striate, scabrous, glabrous. Panicles contracted, loose to open, sparse, 15–30 cm long, branches naked in *ca* lower half; glumes linear-ovate, unequal, lower longer than upper, lower long acuminate, 0.8–1.5 cm long, often caducous, upper abruptly acuminate, cuspidate to aristulate, 0.7–1.1 cm long; lemma pale with purple spots, cartilaginous, linear-elliptic, 7–9 mm long, minutely verrucose, awns flattened or concave in lower part, filiform upwards, divergent, stiff, middle one 1.2–2.2 cm long, laterals 0.9–1.6 cm long.

Recorded from all districts, usually in open forests on hillsides.

14. *Aristida warburgii* Mez

Aristida heterochaeta Henrard; *A. intricata* S. T. Blake

Compact perennial 30–90 cm tall; culms simple, erect or sprawling. Leaf sheaths glabrous; ligules less than 0.5 mm long; leaf blades conduplicate-involute, setaceous, 6–25 cm \times 0.1–0.2 cm, minutely scabrous. Panicles contracted, loose, interrupted, usually 11–15 cm long, branches few; glumes linear-ovate, obtuse, entire, mucronate, unequal, upper longer, lower 0.7–1.4 cm long, scabrous or smooth, upper 0.8–1.8 cm long, smooth, often incurved; lemma brown, usually with purple markings, linear-elliptic, 0.7–1.2 cm long, sparsely scabrous near apex, or smooth, column 0.5–1.7 cm long, awns dissimilar, middle stout, sharply recurved to divergent, 1.7–4.5 cm long, laterals thinner than middle awn, divaricate or sharply bent or curved, often contorted, (0.8–)1.2–3.5 cm long.

Recorded from Darling Downs, Moreton and Wide Bay districts, often on sandy or hard stony soils.

15. *Aristida latifolia* Domin.*Aristida latifolia* var. *minor* J. M. Black

Tussock-forming perennial up to ca 90 cm tall, culms usually simple, erect. Leaf sheaths glabrous; ligules 0.5–1 mm long; leaf blades conduplicate or flat, acute, 10–35 cm \times 0.2–0.45 cm, usually coiled or curly, scabrous. Panicles usually spiciform, 12–45 cm long, branches bipartite, generally short; glumes linear-ovate, long acuminate, entire or upper emarginate, equal or upper slightly longer, 0.9–1.2(–1.5) cm long, usually 1-nerved, usually scabrous; lemma usually brownish with purple markings, linear-elliptic, 0.7–1.1 cm long, tuberculate-scabrous in ca upper half, column of 1–9 spirals, 3–7 mm long, usually exerted above glumes, awns filiform, stiffly divaricate, middle one 1.8–3.5 cm long, laterals 1.7–3.3 cm long.

Darling Downs district, often growing on sandy clay or sandy loam soils.

16. *Aristida caput-medusae* Domin**MANY HEADED WIREGRASS***Aristida vagans* Cav. var. *compacta* Benth.; *A. ramosa* R. Br. var. *compacta* Benth.

Perennial 30–80 cm tall, with knotty rootstock, forming compact tussocks; culms wiry, strongly branched, often fastigate at nodes. Leaf sheaths smooth or minutely scabrous; ligules up to 0.5 mm long; leaf blades soon conduplicate, firmly pointed, 0.5–8 cm \times 0.1–0.2 cm, rigid, scabrous. Panicles spiciform, dense or occasionally rather loose, 2–5 cm long, branches up to 9 mm long, divaricate, pulvini prominent; glumes narrowly ovate to oblong-ovate, unequal, upper longer than lower, lower acute to obtuse, mucronate, 2.5–6 mm long, upper acute to obtuse, sometimes notched, acuminate, 4–8.5 mm long; lemma pallid or purple, sometimes mottled, distinctly longer than longest glume, 6–10 mm long, sometimes minutely scabrous towards apex, awns divergent to divaricate, middle one 0.7–1.5 cm long, laterals 0.6–1.4 cm long. **Fig. 23G.**

Scattered throughout the region, often in areas of shallow stony or sandy soil in open forest.

17. *Aristida gracilipes* Henrard*Aristida vagans* Cav. var. *gracillima* Benth.; *A. vagans* var. *gracilipes* Domin

Slender perennial 0.6–1.2 m tall; culms branched, usually fastigate, many-noded. Leaf sheaths smooth or minutely scabrous; ligules less than 0.5 mm long; blades soon conduplicate, fine and finely pointed, 1–15 cm \times 0.1–0.2 cm, scabrous. Panicles contracted, loose to open, 12–21 cm long, branches few, distant, filiform, naked in lower part; glumes linear-ovate, unequal, lower shorter than upper, lower acuminate, 3.5–8 mm long, sometimes minutely scabrid, upper entire or notched, aristulate, 5.5–10 mm long; lemma pallid, linear-elliptic, 0.8–1.1 cm long, smooth or minutely scabrous in upper part, awns filiform, stiff, usually divergent, middle one 1–2 cm long, laterals 0.8–1.6 cm long. **Fig. 24A.**

Scattered throughout the region, usually on open or stony slopes, in open forest or margins of depauperate rainforest.

18. *Aristida vagans* Cav.**THREEAWN SPEARGRASS***Aristida parviflora* Steudel

Perennial 35–80 cm tall; culms simple or sometimes strongly branched. Leaf sheaths glabrous, somewhat striate; ligules usually less than 0.5 mm long; blades convolute-conduplicate or flat, attenuate, 4–15 cm \times 0.15–0.3 cm, long scabrous and sometimes pilose. Panicles loose or open, 6–12(–16) cm long, branches few, distant, divaricate to horizontally spreading; glumes very narrowly ovate, acuminate, smooth, \pm equal or upper longer, lower 3.5–5.5 mm long, upper usually obtuse and notched, mucronate, 4–7 mm long; lemma linear-elliptic, beaked, 0.8–1.2 cm long, smooth, awns filiform, flattened in lower part, divergent or divaricate or middle one sometimes recurved, middle one 0.7–1.3 cm long, laterals 0.5–1.1 cm long. **Fig. 24D.**

Recorded from all districts of the region, often on shallow or rocky soils on hillsides.

19. *Aristida ramosa* R. Br.**PURPLE WIREGRASS**

Perennial 0.25–1 m tall; culms usually terete, usually branched and fastigate, often tuberculate. Leaf sheaths often tuberculate; ligules 0.5–1 mm long; blades flattened in lower part, or convolute or conduplicate, attenuate, 3–18 cm \times 0.1–0.3 cm, long scabrous

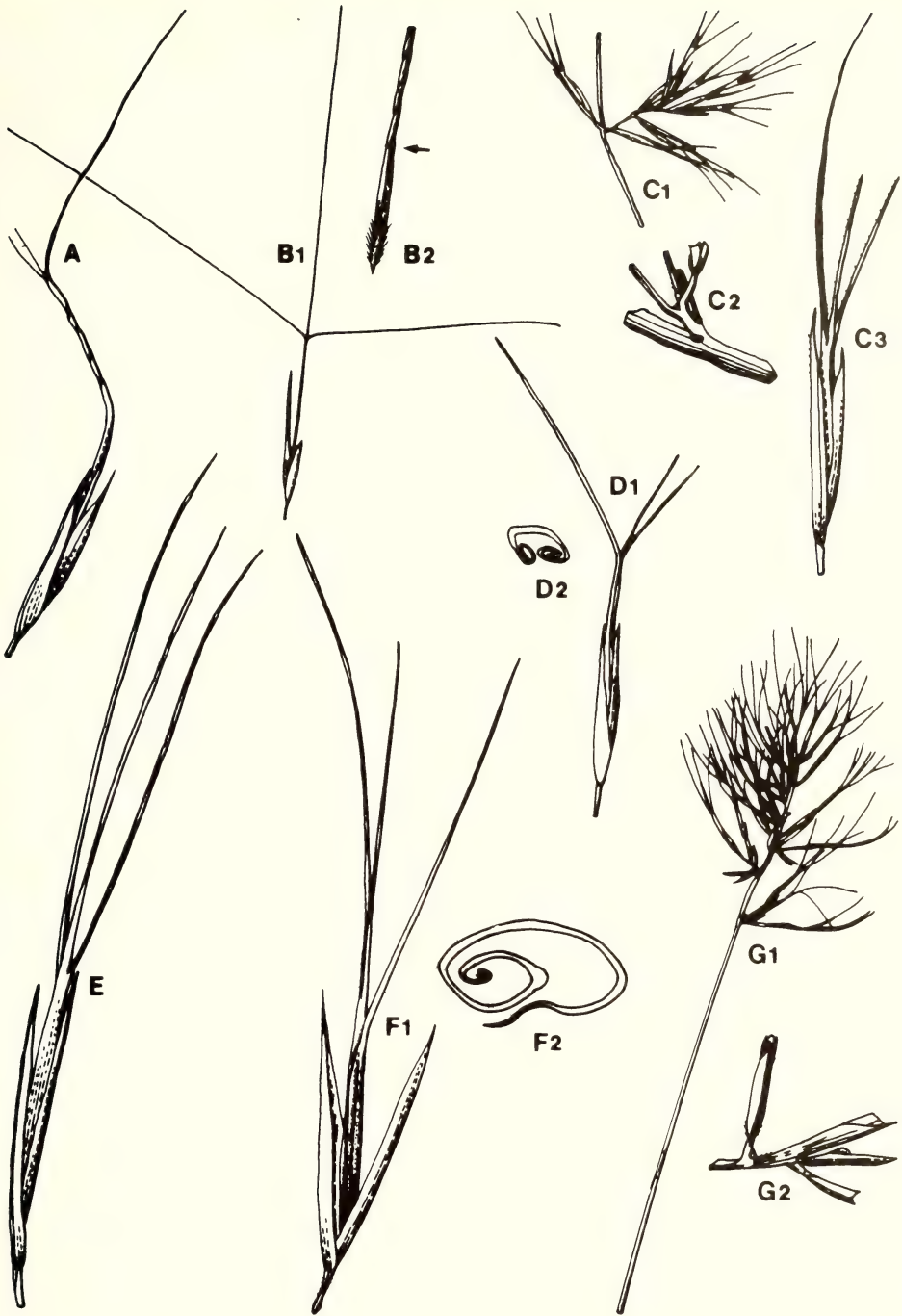


Fig. 23 POACEAE — *Aristida* spp. — **A** *A. spuria*, spikelet showing very short lateral awns x 3; **B₁–B₂** *A. contorta*, **B₁** spikelet x 1, **B₂** articulation on lemma x 3; **C₁–C₃** *A. calycina* var. *calycina*, **C₁** part inflorescence x 1, **C₂** pulvini in axils of inflorescence branchlets x 4, **C₃** spikelet x 3; **D₁–D₂** *A. queenslandica*, **D₁** spikelet x 3, **D₂** T.S. of lemma showing involute margins x 25; **E** *A. sciuroides*, spikelet x 3; **F₁–F₂** *A. lazaridis*, **F₁** spikelet x 3, **F₂** T.S. of lemma showing protuding margin x 25; **G₁–G₂** *A. caput-medusae*, **G₁** inflorescence x 1, **G₂** pulvini in axils of inflorescence branchlets x 4.

above, often pilose near ligule. Panicles spiciform to interrupted spiciform or contracted, 8–30 cm long, branches usually with spikelets from base; glumes very narrowly ovate, equal or unequal, upper longer than lower, lower acute or abruptly acuminate, 4–6.5(–8) mm long, upper obtuse or subacute, entire or notched, 5–8(–10) mm long; lemma pallid or purple, linear-elliptic, \pm beaked, convolute though sometimes appearing furrowed, 0.8–1.2 cm long, glabrous, smooth, scabrous, awns filiform, divergent, straight or sometimes recurved, middle one flattened in lower part, 1–1.8(–2.6) cm long, laterals 1–1.3(–2.5) cm long.

Three varieties occur in the region:

- | | | | | | | |
|--|---|---|---|---|--|---|
| 1. Lemma spiny-scabrous at least on upper half | . | . | . | . | <i>A. ramosa</i> var. <i>scaberula</i> | |
| Lemma \pm smooth | . | . | . | . | . | 2 |
| 2. Inflorescences spiciform | . | . | . | . | <i>A. ramosa</i> var. <i>ramosa</i> | |
| Inflorescences lax, branches filiform | . | . | . | . | <i>A. ramosa</i> var. <i>speciosa</i> | |

A. ramosa var. *ramosa* has been recorded from Moreton, Darling Downs and Burnett districts while *A. ramosa* var. *scaberula* (*A. echinata* Henrard) has been recorded from Wide Bay and Darling Downs districts, both usually on sandy loams. *A. ramosa* var. *speciosa* Henrard (*A. personata* Henrard) has been recorded from all districts.

20. *Aristida lignosa* B. Simon

Very robust perennial 0.6–1.8 m tall, shortly rhizomatous, basally compact; culms branched, often fastigate at nodes. Leaf sheaths somewhat striate, glabrous; ligules up to 0.5 mm long; leaf blades flat or involute, attenuate, 5–33 cm \times 0.2–0.4 cm, scabrous. Panicles narrow, open or spiciform, 7–30 cm long, branches filiform, spikelets from base or only in upper half; glumes very narrowly ovate, acuminate or notched and aristulate, often minutely scabrid along keel, lower shorter than upper, lower 5–8 mm long, upper 7–10 mm long; lemma pale, convolute, linear-elliptic, 0.6–1.1 cm long, scabrous all over or at least towards apex, awns filiform, divergent, middle one 1.2–2.2 cm long, laterals 0.7–1.9 cm long. **Fig. 24B.**

Scattered in the region, often in areas with stony outcrops or hillsides.

21. *Aristida leichhardtiana* Domin

Aristida ramosa var. *leptathera* Benth.

Slender perennial 30–50 cm tall, shortly rhizomatous; culms very thin, branched. Leaf sheaths smooth or minutely scabrous; ligules 0.5–1 mm long; blades flat or conduplicate, attenuate, 1–12 cm \times 0.1–0.2 cm, scabrous. Panicles loose to open, 5–8 cm long, branches few, short, without spikelets on lower part; glumes very narrowly ovate, long acuminate, smooth or minutely scabrous, lower 4–8 mm long, much shorter than upper, upper 0.7–1.2 cm long; lemma purple or brown, linear-elliptic, 0.9–1.1 cm long, smooth or minutely scabrous towards apex, awns filiform, divergent or divaricate, middle one 1.2–3.3 cm long, laterals 1–3 cm long.

Moreton, Darling Downs and Burnett districts, often on sandy or stony soil, in open forest.

22. *Aristida leptopoda* Benth.

WHITE SPEARGRASS

Basally compact, tussock forming perennial 30–70 cm tall; culms usually strongly branched and fastigate at upper nodes. Leaf sheaths striate, minutely scabrous, becoming loose with age; ligules 0.5–1 mm long; blades convolute or conduplicate, attenuate, 5–30 cm \times 0.2–0.3 cm, scabrous, striate. Panicles open, 14–25 cm long, branches divaricate to drooping, naked except for 2 or 1 terminal spikelets; glumes very narrowly ovate, very long acuminate, \pm equal or lower shorter than upper, lower 0.8–1.8 cm long, scabrous on keel, upper 1.2–2.2 cm long, mostly smooth; lemma pallid or purple, linear-elliptic, 0.9–1.6 cm long, smooth or sparsely minutely scabrous towards apex, awns filiform, stiff, divergent, middle one 1.1–3.8 cm long, laterals 0.9–3.2 cm long.

Darling Downs and Burnett districts, on either heavy or sandy soils, usually in open forest or grassland.



Fig. 24 POACEAE — *Aristida* spp. — A₁–A₂ *A. gracilipes*, A₁ inflorescence x 1, A₂ T.S. of lemma showing convolute margins x 25; B *A. lignosa*, spikelet showing scabrid lemma x 3; C *A. obscura*, part inflorescence showing several branchlets per branch x 1; D *A. vagans*, inflorescence x 1; E *A. blakei*, spikelet showing lemma as long as lower glume x 3.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------|
| 1. Plants up to 30 cm tall | . | . | . | . | . | . | . | . | . | . | . | . | . | 2 |
| Plants 30–100 cm tall | . | . | . | . | . | . | . | . | . | . | . | . | . | 3 |
| 2. Ligules membranous, lacerate, 0.5–1 mm long; plants stoloniferous only | | | | | | | | | | | | | | 1. <i>C. incompletus</i> |
| Ligules densely ciliolate, less than 0.5 mm long; plants stoloniferous and rhizomatous | . | . | . | . | . | . | . | . | . | . | . | . | . | 2. <i>C. dactylon</i> |
| 3. Culms soft, 30–60 cm tall; spikes 3–10 in 1 or sometimes 2 whorls, slender or flexuous but not stiffly spreading | | | | | | | | | | | | | | 3. <i>C. nlemfuensis</i> |
| Culms hard, shining and woody, 40–100 cm tall; spikes 5–17 in 2–5, or rarely 1, whorls, stiff and spreading | | | | | | | | | | | | | | 4. <i>C. aethiopicus</i> |

1. *Cynodon incompletus Nees

BLUE COUCH

Slender stoloniferous perennial without rhizomes; culms up to 30 cm tall, but generally less than 15 cm tall. Ligules membranous, lacerate, 0.5–1 mm long, hair tufts at ends only; leaf blades narrowly triangular to linear-triangular, attenuate, 1.5–10 cm × 0.1–0.3 cm, minutely scabrous, often puberulent with long tubercular-based hairs. Spikes 3–5 in 1 whorl, each 2–5 cm long; glumes acute to acuminate, 1–3 mm long, smooth or minutely scabrous; lemma blunt or very shortly mucronate, 2–3 mm long, ciliolate along keel.

Native of South Africa; recorded from eastern Darling Downs, Burnett and Moreton districts on black or red basaltic soils. Can be toxic to stock; contains a glycoside yielding HCN.

This species is relatively uncommon in Queensland, and not to be confused with the common turf species *Digitaria didactyla*, QUEENSLAND BLUE COUCH.

2. Cynodon dactylon (L.) Pers.

COUCH; GREEN COUCH; BERMUDA GRASS

Panicum dactylon L.; *Cynodon dactylon* var. *pulchellus* F. Muell. ex Benth.

Rhizomatous and stoloniferous perennial; culms erect or geniculate, up to 30 cm tall. Ligules a dense row of short hairs on a membranous rim 0.2 mm long, with tuft of longer hairs at either end; leaf blades linear-triangular, attenuate, 1.5–15 cm × 0.2–0.4 cm, glabrous or sparsely pubescent, minutely scabrous on margin. Spikes 2–6 in 1 whorl, each 2–5 cm long; glumes acuminate, 1–2.5 mm long, minutely scabrous on keel; lemma mucronate, 1.5–3 mm long, ciliolate along keel. **Fig. 25A.**

Widespread through the region; extensively cultivated as a lawn grass, and in some areas for pasture.

3. *Cynodon nlemfuensis Vanderyst

AFRICAN STARGRASS

Cynodon plectostachyus auct. non (K. Schum.) Pilger

Stoloniferous perennial without rhizomes; culms soft, 30–60 cm tall. Ligules a scarious ciliolate rim 0.3 mm long; leaf blades linear-triangular, attenuate, 3–16 cm × 0.2–0.6 cm, minutely scabrous, occasionally with scattered hairs. Spike-like racemes 3–13 in 1 or sometimes 2 whorls, slender or flexuous, but not stiffly spreading, each 3.5–10 cm long; glumes acuminate, 1–2.5 mm long, smooth or occasionally minutely scabrous along keel; lemma mucronate, 2–3 mm long, ciliate along keel.

Two varieties occur in the region:

- | | |
|--|---|
| 1. Culms 1–1.5 mm diameter; leaf blades 2–5 mm wide; racemes 3–9, each 3.5–7 cm long | <i>C. nlemfuensis</i> var. <i>nlemfuensis</i> |
| Culms 2–3 mm diameter; leaf blades 5–6 mm wide; racemes 6–13, each 6–10 cm long | <i>C. nlemfuensis</i> var. <i>robustus</i> |

Native of tropical Africa; originally introduced as a pasture grass. *C. nlemfuensis* var. *nlemfuensis* is recorded from all districts of the region, usually on loose soils or moist streamside sites. *C. nlemfuensis* var. *robustus* Clayton & Harlan has been recorded from the Burnett district, growing on an embankment.

4. *Cynodon aethiopicus W. D. Clayton & Harlan

AFRICAN STARGRASS

Cynodon plectostachyus auct. non (K. Schum.) Pilger

Coarse stoloniferous perennial without rhizomes; culms hard shining and woody, 40–100 cm tall. Ligules a membranous ciliolate rim 0.3 mm long; leaf blades linear-triangular, attenuate, 3–25 cm × 0.3–0.7 cm, stiff and harsh, minutely scabrous, occasionally with scattered hairs. Spike-like racemes 5–17 in 2–5, or rarely 1, whorls, stiff and spreading, each 4–8 cm long; glumes acuminate, 1.5–2.5 mm long, smooth or minutely scabrous along keel; lemma mucronate, 2–2.5 mm long, ciliolate along keel. **Fig. 25B.**

Native of tropical Africa; introduced as a pasture grass, now naturalized in Moreton and Darling Downs districts, preferring rich soils and moist streamside sites.

48. × CYNOCHLORIS Clifford & Everist

Perennials, intermediate between *Chloris* and *Cynodon*. Inflorescences a digitate arrangement of 3–5 spikes, spikelets alternating in 2 rows on one side of rachis; spikelets ± sessile, rachilla disarticulating above glumes, florets 2, lower bisexual, upper reduced to shortly aristate lemma; glumes unequal, keeled, 1-nerved; lower lemma with 2-lobed

apex, 3-nerved, keeled, awn arising from between lobes and longer than them, slender, straight; palea membranous, 2-keeled; callus ciliate; stamens 3; styles 2, stigmas plumose. Caryopses abortive.

2 hybrid species Australia, both occurring in south-eastern Queensland.

- | | | | |
|---|---|---|-----------------------------|
| 1. Lemmas sparsely villous along keels and villous on margins | . | . | 1. × <i>C. macivorii</i> |
| Lemmas sparsely minutely scabrous along keels and margins | . | . | 2. × <i>C. reynoldensis</i> |

1. × *Cynochloris macivorii* Clifford & Everist

Stoloniferous perennial up to 50 cm tall; stolons long, slender; culms suberect, slender. Ligules short, ciliate; leaf blades linear, initially folded, later flattened, acute, 1.5–15 cm × 0.1–0.3 cm, glabrous, sometimes minutely scabrous. Spikes 3–5, terminal, 3.5–8 cm long, outspread, white-pubescent at their base; glumes acuminate, narrow, lower 1–2 mm long, upper 2–3 mm long, both minutely scabrous along keel; lower lemma 2.5–3 mm long, sparsely villous along keel and villous on margin, sparsely minutely scabrid elsewhere, awn 1–2 mm long. **Fig. 25D.**

Recorded originally as a natural hybrid between *Cynodon dactylon* and *Chloris divaricata* on a bowling green at Ipswich, and adjacent areas, possibly still cultivated for use in lawns.

2. × *Cynochloris reynoldensis* B. Simon

Delicate stoloniferous perennial up to 40 cm tall; culms geniculately ascending. Ligules short, ciliate; leaf blades linear, flattened, acute, 2–7.5 cm × 0.1–0.2 cm, sometimes with scattered weak hairs, minutely scabrous. Spikes 2–4, terminal, 2.5–5.5 cm long, white-pubescent at their base; glumes acute to acuminate, lower 1.5–1.75 mm long, upper 2–2.5 mm long, both minutely scabrous along keels; lower lemma obtuse to truncate at apex, 2.5–2.75 mm long, sparsely minutely scabrid along keel and margin only, awn 1.5–2.2 mm long. **Fig. 25C.**

Recorded as a natural hybrid between *Cynodon dactylon* and *Chloris ventricosa* on the banks of Reynolds Ck, near Mt Greville in southern Moreton district.

49. BRACHYACHNE (Benth.) Stapf

Slender annuals or perennials, stoloniferous or decumbent, rarely erect; culms branching. Ligules ciliate membranous rims; leaf blades flat or folded. Inflorescences a digitate arrangement of 3–6 spikes, spikelets in 2 close rows on 1 side only; spikelets solitary, sessile, laterally compressed, rachilla disarticulating above glumes, floret 1, bisexual, rachilla continued as sterile bristle; glumes obtuse, subequal, membranous, 1-nerved, scabrous along nerve; lemma shorter than glumes, membranous, 3-nerved, densely ciliate on nerves; palea as long as lemma, 2-keeled with keels produced into minute points, 2-nerved, pubescent on nerves; stamens 3; ovary glabrous, styles distinct, stigmas plumose. Caryopses smooth, enclosed by but free from lemma and palea.

10 species tropical Africa, Australia; 5 species Australia; 1 species south-eastern Queensland.

1. *Brachyachne convergens* (F. Muell.) Stapf COMMON NATIVE COUCH; SPIDER GRASS

Cynodon convergens F. Muell.

Ascending or erect annual up to 45 cm tall. Ligule cilia 0.2–0.3 mm long; leaf blades linear-ovate to linear-triangular, attenuate, 1.2–11 cm × 0.2–0.4 cm, minutely scabrous. Spikes 2–5 in 1 whorl, each 2–8.5 cm long; glumes acute or mucronate, 3–4 mm long, scabrous along keel; lemma acute, 2–2.5 mm long, densely ciliate along nerves. **Fig. 25E.**

Western Darling Downs district. Toxic to stock; contains a glycoside yielding HCN.

50. CHLORIS Swartz

Tufted rhizomatous or stoloniferous perennials or annuals. Ligules a ciliate membrane; leaf blades linear, flat or folded. Inflorescences a digitate or subdigitate arrangement of 2–15 erect or spreading spikes or spike-like racemes, spikelets alternate in 2 rows along rachis; spikelets shortly pedicellate or subsessile, rachilla disarticulating above glumes,

florets 2–7, lowest 1 or rarely 2 bisexual, others male or sterile; glumes acute or mucronate, unequal, narrow, keeled, usually 1-nerved; lowest lemma entire or 2-lobed apically, acute, acuminate or central nerve extended into an awn, 3-nerved, usually ciliate on nerves, upper lemmas reduced or vestigial; lowest palea subequal to lemma, narrow, 2-keeled, ciliolate and narrowly winged on keels, others absent; stamens 3; ovary glabrous, styles short, distinct, stigmas plumose. Caryopses ellipsoid to linear, usually trigonous, occasionally dorsally compressed, smooth, shiny, enclosed in scarcely changed lemma and palea.

40 species tropical and warm temperate; 11 species Australia; 6 species south-eastern Queensland.

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|--|-------------------------|---|
| 1. Spikelets on pedicels <i>ca</i> 1 mm long; imperfect floret acute or acuminate, deeply divided into 2 lobes, not inflated | 1. <i>C. divaricata</i> | |
| Spikelets sessile or on pedicels less than 0.5 mm long; imperfect floret(s) obtuse or truncate, notched or obscurely lobed, usually inflated | | 2 |
| 2. Lowest lemma glabrous, scabrous, or rarely minutely pubescent on upper margins, 3–5 mm long | 2. <i>C. ventricosa</i> | |
| Lowest lemma with long stiff white hairs or pubescent on upper half particularly on margins | | 3 |
| 3. Lowest lemma pubescent on upper margins, otherwise glabrous | 3. <i>C. truncata</i> | |
| Lowest lemma ciliate with stiff white hairs, usually pubescent elsewhere as well | | 4 |
| 4. Lemmas glabrous on lower part of margins, lowest lemma 2–3 mm long; spikelets with 3 awns | 4. <i>C. inflata</i> | |
| Lemma of lowest floret ciliate or sparsely pubescent on lower part of margin, 3–3.5 mm long; spikelets with only 2 awns | | 5 |
| 5. Florets 3–4 per spikelet; lemma of lowest floret with cilia on upper margin <i>ca</i> 1 mm long; awn <i>ca</i> 3 mm long | 5. <i>C. gayana</i> | |
| Florets 2 per spikelet; lemma of lowest floret with cilia on upper margin 2–3 mm long; awn 6–10 mm long | 6. <i>C. virgata</i> | |

1. *Chloris divaricata* R. Br. SLENDER CHLORIS; SMALL CHLORIS

Chloris divaricata var. *cynodontoides* (Balansa) Lazarides
Slender, ± glabrous compact perennial up to 60 cm tall; culms erect, decumbent or stoloniferous. Ligules truncate, ciliolate, *ca* 0.5 mm long; leaf blades linear, obtuse to acute, 2–12 cm × 0.1–0.2 cm, usually minutely scabrous. Racemes 3–8 per inflorescence, slender, stiff or flaccid, somewhat erect or spreading, 4–20 cm long; spikelets on pedicels *ca* 1 mm long, florets 2; glumes membranous, narrow, long acuminate, lower 1–2 mm long, upper 2–3.5 mm long, minutely scabrous or smooth; lower lemma with bilobed apex, awned from sinus, 2–3.5 mm long, minutely scabrous, awn capillary, 0.3–1.6 cm long, upper lemma acute, divided into 2 lobes *ca* half as long as lemma, total *ca* 1–1.5 mm long, awn filiform, 5–9 mm long. **Fig. 25F.**

Recorded from all districts of the region, on a variety of soils.

2. *Chloris ventricosa* R. Br. TALL CHLORIS

Chloris sclerantha Lindl.; *C. ventricosa* var. *tenuis* Benth.
Usually glabrous leafy perennial up to 75 cm tall; culms erect or sometimes stoloniferous. Ligules truncate, ciliolate, *ca* 0.5 mm long; leaf blades usually flat, linear, abruptly acute, 4–16 cm × 0.2–0.3 cm, minutely scabrous, rarely pilose. Spikes 2–9 per inflorescence, spreading, flaccid, usually hirsute near base, 4–10 cm long; florets 2 or rarely 3 per spikelet; glumes membranous, narrowly ovate, acute or acuminate, lower 1.25–2 mm long, upper 2–4 mm long, minutely scabrous at least on keel; lower lemma obovate with minute, subobtuse lobes, inflated, glabrous or rarely minutely pubescent on upper margin, 3–5 mm long, minutely scabrous, awn capillary, 0.2–1.7 cm long, second lemma inflated, truncate, closely embraced by margins of first lemma, notched, *ca* 2 mm long, awn often bristle-like, 1–9 mm long. **Fig. 25G.**

Widespread throughout the region, in a variety of habitats. Can contain HCN but no field cases of poisoning have been noted in literature.

3. *Chloris truncata* R. Br.**WINDMILL GRASS**

Chloris truncata forma *abbreviata* Thell.

Compact perennial up to 45 cm tall; culms erect or stoloniferous. Ligules truncate, ciliate, *ca* 0.5 mm long; leaf blades linear-oblong, obtuse, mucronate or subacute, 1.5–14(–22) cm \times 0.15–0.25 cm, minutely scabrous, rarely pilose. Racemes 5–12 per inflorescence, rigid or somewhat flaccid, spreading or divaricate, pubescent at base, 4–19 cm long; spikelets on pedicels *ca* 0.5 mm long, florets 2 or rarely 3; glumes very narrowly ovate, acuminate or mucronate, lower 1–2 mm long, upper 2.5–4 mm long, both minutely scabrous at least on keel; lower lemma obovate with 2 minute obtuse apical lobes, inflated, 3–4 mm long, pubescent on upper margin otherwise glabrous, smooth or sometimes minutely scabrous, awn 1–1.5 cm long, second lemma cuneate, truncate, apically notched, inflated, *ca* 1.5 mm long, appressed to lower lemma, awn filiform, 6–9 mm long. **Fig. 25H.**

Recorded from Moreton and Darling Downs districts, in a variety of habitats. Can contain HCN but no field cases of poisoning have been noted in the literature.

4. *Chloris inflata* Link**PURPLETOP CHLORIS**

Chloris barbata auct. non Swartz; *C. barbata* forma *divaricata* Kuntze

Mainly glabrous annual or short-lived perennial up to 90 cm tall; culms erect or sometimes decumbent. Ligules truncate, ciliate, *ca* 0.5 mm long; leaf blades linear, acuminate, 7–25 cm \times 0.2–0.6 cm, smooth or minutely scabrous. Spikes 7–17 per inflorescence, usually erect and loosely appressed, densely spiculate to base, 2–9 cm long; spikelets on pedicels up to 0.5 mm long, florets almost always 3; glumes very narrowly ovate, acute or acuminate, lower 1.5–2 mm long, upper 2–2.5 mm long, smooth or minutely scabrous along keel; lowest lemma entire or obscurely 2-lobed at apex, 2–3 mm long, with a submarginal fringe of stiff white hairs in upper half, and usually sparsely pubescent near midrib, otherwise glabrous, awn 4–7 mm long, second lemma cuneate, truncate, inflated, awn \pm same as lower lemma, third lemma similar, slightly smaller. **Fig. 25I.**

Recorded from the Moreton district.

5. **Chloris gayana* Kunth**RHODES GRASS**

Largely glabrous perennial up to 1.2 m tall; culms erect or stoloniferous. Ligules truncate, ciliate, *ca* 0.5 mm long, often with long cilia at ends; leaf blades linear, acuminate, 8–28 cm \times 0.2–0.9 cm, minutely scabrous on upper surface or smooth. Spikes 8–17 per inflorescence, erect or oblique, loosely appressed, 7–10 cm long; florets usually 3 or 4, the second male or rarely bisexual, remainder usually sterile; glumes membranous, narrowly ovate to narrowly elliptic, lower mucronate, 1.5–2 mm long, upper aristate, 2.5–3.5 mm long, both minutely scabrous; lowest lemma obscurely lobed, awned from apex, *ca* 3 mm long, sparsely pubescent on submarginal nerve below, ciliate above with stiff white hairs up to 1 mm long, awn *ca* 3 mm long, second lemma *ca* 2.5 mm long, awn *ca* 1.5 mm long, other lemmas smaller and awnless. **Fig. 25J.**

Native of Africa; widely cultivated as a pasture grass and naturalized in all districts of the region.

6. *Chloris virgata* Swartz**FEATHERTOP RHODES GRASS**

Chloris gabrielae Domin; *C. decora* Nees ex Steudel; *C. barbata* Swartz var. *decora* (Nees ex Steudel) Benth.

Largely glabrous annual up to 1 m tall; culms erect or sometimes decumbent. Ligules truncate, ciliate, 0.5–1 mm long, often with cilia near ends; leaf blades linear, attenuate, 5–25 cm \times 0.3–0.6 cm, smooth or minutely scabrous, sometimes sparsely pubescent. Spikes 7–19 per inflorescence, erect, stiff, appressed, 3–9 cm long; florets 2; glumes usually hyaline, very narrowly ovate, lower acuminate or mucronate, 1.5–2 mm long, upper aristate, 3.5–4.5 mm long, both minutely scabrous; lower lemma entire or notched at apex, usually grooved between mid-nerve and margin, lower margin pubescent, upper margin bearded with stiff white hairs 2–3 mm long, 3–3.5 mm long, smooth, sometimes bearded on mid-nerve on lower part, awn filiform, stiff, 6–10 mm long, upper lemma truncate, *ca* 2 mm long, awn slightly shorter than lower lemma awn. **Fig. 25K.**

Cosmopolitan species; recorded from all districts of the region, often regarded as a weed.

51. ENTEROPOGON Nees

Perennials. Ligules a ciliate membrane; leaf blades flat or conduplicate. Inflorescences of 1–many digitate spikes, bearded or pubescent in axils; spikelets biseriate on continuous rachis; spikelets solitary, dorsally compressed, florets 2 or 3, lowest bisexual, 1 or 2 male or sterile, rachilla terminated by floret or sometimes extended; glumes unequal, keeled, 1-nerved, mucronate or cuspidate, glabrous; lowest lemma rounded or flattened dorsally, with ridged mid-nerve, glabrous, awned from apex; palea subequal to lemma or shorter, 2-keeled, ciliolate on keels; upper floret(s) smaller, lemma reduced, palea usually absent; callus bearded; stamens 3; ovary glabrous, styles 2, stigmas plumose. Caryopses narrowly ellipsoid-obloid, dorsally compressed, smooth, shiny, flat or concave on upper surface.

8 species Africa, Madagascar, Seychelles, India, Taiwan, Australia, Pacific region; 6 species Australia; 4 species south-eastern Queensland.

- | | | |
|--|---------------------------|---|
| 1. Leaves produced uniformly along culm | 1. <i>E. ramosus</i> | |
| Leaves mostly basal on culm | | 2 |
| 2. Inflorescence spikes usually more than 9, spreading in several planes | 2. <i>E. acicularis</i> | |
| Inflorescence spikes up to 4, usually arranged in a single plane | | 3 |
| 3. Spikes 1, rarely 2 or 3; leaf blades filiform, or if flat up to 1 mm wide | 3. <i>E. unispiceus</i> | |
| Spikes 3 or 4; leaf blades flat, more than 1.5 mm wide | 4. <i>E. paucispiceus</i> | |

1. *Enteropogon ramosus* B. Simon

Chloris acicularis Lindl. var. *queenslandiae* Domin; *Enteropogon acicularis* (Lindl.) Lazarides form A

Tufted perennial up to ca 1 m tall; culms glabrous, divided with up to 8 branches from lower nodes. Leaves arising along whole culm length; sheaths glabrous, glaucous; ligules ciliolate, up to 0.3 mm long; blades linear, twisted abruptly at intervals at maturity, apex tapering and filiform, up to 20 cm × 0.5 cm, glabrous, glaucous, scabrous on margin. Spikes 2–6, rarely –8 per inflorescence, digitate, spreading in a single plane, 4–15 cm long; glumes hyaline, linear, acuminate, keels scabrous, lower 2–3.5 mm long, upper 3.5–7 mm long; lower lemma acuminate, 5–9 mm long, 3-nerved, minutely scabrous, awn 1–1.5 cm long, second lemma 2–4 mm long, awn 0.7–1.2 cm long, third minute or absent.

Fig. 25L.

Western districts of the region, tending to grow on duplex or texture contrast soils with sand overlying clay.

2. *Enteropogon acicularis* (Lindl.) Lazarides**CURLY WINDMILL GRASS**

Chloris acicularis Lindl.; *C. moorei* F. Muell.

Tufted perennial up to ca 40 cm tall; culms usually pilose, usually solitary. Leaves usually arising from base of culm; sheaths glabrous or pilose; ligules ciliate, usually ca 1 mm long; blades linear, seldom twisting abruptly, apex long acuminate, up to 20 cm × 0.4 cm, usually pilose, minutely scabrous. Spikes 7–22, digitate or sometimes subdigitate, arranged in several planes, 4–22 cm long; glumes hyaline, very narrowly ovate, long acuminate, keels scabrous, lower 2–5 mm long, upper 0.45–1.1 cm long; lower lemma acute, notched, 5–9 mm long, 3-nerved, minutely scabrous or rarely smooth below, awn 1–2.2 cm long, second lemma 3–4 mm long, awn 1–1.7 cm long.

Recorded from Moreton, Darling Downs and Burnett districts, generally restricted to cracking clay soils.

3. *Enteropogon unispiceus* (F. Muell.) W. D. Clayton

Chloris unispicea F. Muell.

Compact slender perennial up to ca 60 cm tall; culms glabrous, thin, branched in lower part or simple. Leaves usually arising from base of culm; sheaths glabrous or pilose with tubercular-based hairs; ligules ca 0.5 mm long; blades linear, involute, convolute or sometimes flat, straight or curly with age, acuminate, up to 7.5 cm × 0.1 cm, glabrous or sometimes pilose on upper surface with fine tubercular-based hairs. Spikes 1 or rarely 2

or 3, usually flaccid, divergent, 2.5–10 cm long; glumes membranous or hyaline, very narrowly ovate, acuminate, keel usually scabrous, lower 2–3.5 mm long, upper 3–5.5 mm long; lower lemma acuminate, notched, 4–7 mm long, minutely scabrous upward or smooth, awn 0.8–1.3 cm long, upper lemma *ca* 2 mm long, awn 4–5 mm long.

Throughout the region, often on poor or sandy soils, or in crevices on rocky areas.

4. *Enteropogon paucispiceus* (Lazarides) B. Simon

Enteropogon unispiceus (F. Muell.) W. D. Clayton var. *paucispiceus* Lazarides

Compact slender perennial up to *ca* 60 cm tall, sometimes glaucous; culms glabrous, simple or rarely branched at base. Leaves usually arising from base of culm; sheaths \pm glabrous; ligules *ca* 0.5 mm long; blades linear, flat, \pm straight, acuminate, up to 12 cm \times 0.15–0.25 cm, glabrous. Spikes 3 or 4, digitate, 6–10 cm long; glumes membranous or hyaline, very narrowly ovate, acuminate, keel usually scabrous, lower 2–3 mm long, upper 4–5 mm long; lower lemma acuminate, notched, 5–7 mm long, minutely scabrous near apex or smooth, awn 0.8–1.2 cm long, upper lemma *ca* 2 mm long, awn *ca* 4–5 mm long.

Moreton and Darling Downs districts, often in brigalow country.

52. EUSTACHYS Desvaux

Annuals or perennials. Leaf sheaths strongly keeled, flabellate; ligules usually a fringe of hairs; leaf blades flat and folded, obtuse, occasionally acuminate. Inflorescences terminal, consisting of 2–many digitate 1-sided spikes bearing densely packed spikelets; spikelets with 2 florets, rarely also an intermediate male floret, lower floret bisexual, upper sterile; glumes 2, shorter than spikelet, subequal, upper broader with short straight awn from just below apex; fertile lemma cartilaginous to chartaceous, broadly ovate when flattened, laterally compressed and sharply keeled, acute to emarginate with or without short awn from just below membranous apex, upper floret reduced to small clavate lemma crowning rachilla. Caryopses obovoid, plump.

12 species tropical America, West Indies, tropical and southern Africa; 1 species naturalized Australia, occurring in south-eastern Queensland.

1. **Eustachys distichophylla* (Lag.) Nees

EVERGREEN CHLORIS

Chloris distichophylla Lag.

Perennial with short branched rhizomes. Leaves distichous; leaf sheaths compressed, often purplish at base; ligules a very short rim; leaf blades linear, laterally folded or becoming flattened with age, apex blunt, up to 40 cm \times 2 cm, hispidulous on margins and midrib below. Inflorescences with up to 45 digitate or subdigitate spikes; spikelets 2–2.5 mm long, laterally compressed, disarticulating above glumes; glumes pale, rounded on back, apex emarginate or obtuse, erose, 1-nerved, unequal, lower *ca* 1.5 mm long, upper *ca* 2 mm long with awn *ca* 0.5 mm long arising from nerve, minutely scabrous; lemmas usually brown at maturity, awnless, lower lemma mucronate, 2–2.5 mm long, 3-nerved, densely ciliate on margin, upper lemma obtuse or truncate, inflated, *ca* 1.5 mm long. **Fig. 25M.**

Native of South America; introduced as a pasture grass, now naturalized and scattered throughout the region. Can contain potentially toxic amounts of HCN but no reports of poisoning have been recorded in the literature.

53. ASTREBLA F. Muell. ex Benth.

Strongly tufted perennials; culms erect or ascending, arising from scaly bases. Ligules reduced to ciliate rim; leaf blades rolled in bud, narrow. Inflorescences of terminal spikes or spike-like racemes, solitary or paired, rachis triquetrous; spikelets solitary, overlapping, not falling entire, rachilla disarticulating above glumes but not between lemmas; florets 2–9, bisexual, uppermost often reduced; glumes slightly unequal, linear to elliptic, acute, keeled, lower 2–9-nerved, upper longer, 7–13-nerved; lemmas toughly coriaceous or scarious, longer than glumes, deeply 3-lobed, middle lobe tapering from broad base into

tough straight curved or hooked bristle or awn, rounded on back, 1–5-nerved; paleas shorter than lemmas, dorsally compressed, 2-keeled, keels ciliate; callus obsolete; stamens 3; ovary glabrous, styles distinct, short, terminal, stigmas plumose. Caryopses oblong or elliptic in outline, dorsally compressed, loosely embraced by hardened lemma and palea.

4 species endemic in Australia; 3 species south-eastern Queensland.

- | | | |
|--|------------------------|---|
| 1. Spikes or racemes slender, 0.2–0.6 cm broad including spikelets | 1. <i>A. elymoides</i> | 2 |
| Spikes or racemes 0.8–2 cm broad including spikelets | | |
| 2. Spikelets loosely overlapping and alternate; lower glume 1–3-nerved; outer lobes of lemma with narrow scarious margins less than half length of lemma | 2. <i>A. lappacea</i> | |
| Spikelets densely overlapping; lower glume 5–9-nerved; outer lobes of lemma with scarious margins at least half width of lobe and half length of lemma | 3. <i>A. pectinata</i> | |

1. *Astrebala elymoides* F. Muell. ex F. M. Bailey

HOOP MITCHELL GRASS

Astrebala pectinata (Lindl.) F. Muell. ex Benth. var. *elymoides* (F. Muell. ex F. M. Bailey) F. M. Bailey

Tufted perennial up to 1.2 m tall; culms leafy, erect or geniculately ascending from decumbent base. Leaf sheaths \pm keeled, glaucous, glabrous; ligule cilia ca 0.5 mm long; leaf blades linear, attenuate, 5–15 cm \times 0.2–0.5 cm, glabrous, usually margin scabrous. Spike-like racemes solitary, 12–35 cm long, pedicels stout, 0.5–1 mm long; spikelets distant, slightly overlapping towards apex, 1–2 cm long, florets 4–7; glumes narrowly ovate, \pm acute, lower 0.7–1.4 cm long, 5–9-nerved, upper 0.8–1.3 cm long, 7–16-nerved; lowest lemma oblong, 1.2–1.7 cm long, densely villous all over undivided part, lateral lobes acute, 0.7–1.2 cm long, middle lobe tapering to bristle up to 5 mm, rarely up to 10 mm long.

Darling Downs district, e.g. Goondiwindi, Dalby, Chinchilla areas.

2. *Astrebala lappacea* (Lindl.) Domin

CURLY MITCHELL GRASS

Danthonia lappacea Lindl.; *Astrebala triticoides* (Lindl.) F. Muell. ex Benth.; *A. pectinata* (Lindl.) F. Muell. ex Benth. var. *triticoides* F. M. Bailey

Densely tufted perennial up to ca 90 cm tall; culms geniculately ascending or erect, usually branched. Leaf sheaths tight, glabrous and smooth or hispid and tuberculate towards top; ligule cilia up to 0.5 mm long; leaf blades linear-oblong, acute, 5–17.5 cm \times 0.2–0.5 cm, glabrous, tuberculate or minutely scabrous. Spike-like racemes 5–30 cm long, pedicels 0.5–1 mm long; spikelets distant in lower part of raceme, \pm overlapping elsewhere, 0.7–1.3 cm long, florets 4–6; glumes unequal, lower glume \pm narrowly ovate, acute, 0.4–1 cm long, 1–5-nerved, upper glume elliptic, acuminate or mucronate, 0.7–1.3 cm long, 7–13-nerved; lowest lemma \pm oblong, 0.8–1.3 cm long, densely villous over undivided part, lateral lobes finely acute, 4–10 mm long, middle lobe tapering into rigid unhooked bristle 0.4–1.4 cm long.

Recorded once from Darling Downs district.

3. *Astrebala pectinata* (Lindl.) F. Muell. ex Benth.

BARLEY MITCHELL GRASS

Danthonia pectinata Lindl.

Densely tufted perennial up to ca 90 cm tall; culms erect from short rhizome clothed with short fine cataphylls. Leaf sheaths tight, finely striate, glabrous, or orifice bearded; ligule cilia ca 0.5 mm long; leaf blades linear, attenuate, 5–17 cm \times 0.3–0.6 cm, flat and glaucous, often twisted, sparsely pubescent with tubercular-based hairs, minutely scabrous on margin. Spike-like racemes 4–13 cm long, pedicels stout, 0.5–2 mm long; spikelets densely overlapping, 1–1.7 cm long, florets 4–7; glumes narrowly ovate, acute, lower 0.7–1.4 cm long, 5–9-nerved; upper 0.8–1.6 cm long, 7–16-nerved; lowest lemma \pm oblong, 1.2–1.7 cm long, densely villous all over undivided part, lateral lobes acute, 0.7–1.2 cm long, middle lobe tapering to bristle up to 1.6 cm long. **Fig. 25N.**

Recorded from Darling Downs district; rarely collected.



Fig. 25 POACEAE A-B *Cynodon* spp. — A₁-A₃ *C. dactylon*, A₁ ligule x 1½, A₂ inflorescence x ½, A₃ spikelet x 3; B *C. aethiopicus*, inflorescence x ½; C-D × *Cynochloris* spp. — C × *C. reynoldensis*, lemma x 6; D × *C. macivorii*, spikelet x 6; E₁-E₂ *Brachyachne convergens*, E₁ spike showing arrangement of rows x 3, E₂ spikelet x 6; F-K *Chloris* spp. — F-K spikelets, all x 3 — F *C. divaricata*; G *C. ventricosa*; H *C. truncata*; I *C. inflata*; J₂ *C. gayana*; K *C. virgata*; J₁ *C. gayana*, section of spike showing 2 alternate rows of spikelets x 1½; L *Enteropogon ramosus*, spikelet x 6; M *Eustachys distichophylla*, habit x ⅛; N₁-N₂ *Astrebla pectinata*, N₁ part inflorescence showing densely overlapping spikelets x 1, N₂ spikelets showing scarios margins on lemma x 3.

54. DINEBRA Jacq.

Annuals. Ligules membranous; leaf blades linear, flat. Inflorescences composed of several-many secund spikes irregularly arranged along central axis, spikes short and crowded to linear and distant, deciduous from main rachis or persistent but with lower spikelets on each spike often replaced by small deciduous branchlets; spikelets sessile, wedge-shaped, laterally compressed, closely overlapping, disarticulating between florets, florets 1-several; glumes subequal, acuminate-aristate, much longer than florets, strongly keeled, thinly membranous, pilose on nerves, tip acute to 2-lobed. Caryopses ellipsoid-obloid, shallowly concave on hilar side, trigonous.

3 species tropical and subtropical Africa to India; 1 species Australia, occurring in south-eastern Queensland.

1. **Dinebra retroflexa* (Vahl) Panzer

Cynosurus retroflexus Vahl

Loosely tufted annual up to ca 1 m tall; culms slender, usually straggling and ascending from decumbent base. Leaves glandular, especially on sheaths; ligules minutely lacerate, ca 1-1.5 mm long; leaf blades linear to linear-triangular, attenuate, 4.5-28 cm × 0.4-0.8 cm. Inflorescences 8-35 cm long; spikes densely crowded or spaced up to 3 cm apart, 0.6-5(-7) cm long, ascending at first, reflexing and deciduous at maturity; spikelets closely overlapping on rachis, 4.5-9 mm long, florets 1-3; glumes narrowly elliptic, apex long acuminate, curved, 4-8.5 mm long, glandular and minutely scabrous along keel; lemmas narrowly ovate, acute to emarginate, 1.5-3 mm long, appressed pilose along lateral nerves and lower half of back around central nerve, or ± glabrous. Fig. 27A.

Native of tropical Africa, Egypt, Iraq, India; introduced into trial pasture plots in central Queensland, now naturalized there and also recorded naturalized from Moreton and Darling Downs districts, usually in heavy soils as a weed of cultivation.

55. ERAGROSTIS Wolf

Annuals or perennials, usually tufted but habits various. Ligules usually reduced to ciliate rims, rarely membranous; leaf blades rolled in bud, narrow, flat, convolute. Inflorescences open, contracted or spike-like panicles, branches sometimes racemose; spikelets solitary, pedicellate, laterally compressed, variously disarticulating, florets 3-many, bisexual, usually closely imbricate; glumes unequal, shorter than lowest lemma, 1-nerved or rarely upper 3-nerved; lemmas acute or acuminate, overlapping, keeled or rounded on back, 3-nerved; paleas a little shorter than lemmas, 2-keeled, keels sometimes long persistent; anthers 2 or 3; ovary glabrous, styles distinct, stigmas plumose. Caryopses usually globose to ellipsoid, smooth or finely striate to finely reticulate, pericarp adherent.

300 species cosmopolitan, mostly subtropical; ca 55 species Australia; 22 species south-eastern Queensland.

- | | |
|---|--------------------------|
| 1. Leaf blades with tubercular glands on margins | 2 |
| Leaf blades without tubercular glands on margins | 3 |
| 2. Spikelets 2-4 mm wide; glumes 1.5-2.5 mm long, 3-nerved; lemmas (1.7-)-2-3 mm long | 1. <i>E. cilianensis</i> |
| Spikelets 1-3 mm wide; glumes 1-1.7 mm long, usually 1-nerved; lemmas 1.5-2 mm long | 2. <i>E. minor</i> |
| 3. Spikelets ± biconvex | 3. <i>E. lacunaria</i> |
| Spikelets ± laterally compressed | 4 |
| 4. Perennials with glabrous or woolly pubescent bulbous base; leaf blades setiform | 4. <i>E. setifolia</i> |
| Annuals or slender perennials, hardly thickened at base; leaf blades flat or inrolled | 5 |

- | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|--------------------------------|----|
| 5. Lateral nerves of lemma distinct | . | . | . | . | . | . | . | . | . | . | 6 |
| Lateral nerves of lemma indistinct | . | . | . | . | . | . | . | . | . | . | 13 |
| 6. Lemmas 2.5–4 mm long | . | . | . | . | . | . | . | . | . | . | 7 |
| Lemmas less than 2.5 mm long | . | . | . | . | . | . | . | . | . | . | 8 |
| 7. Plants generally glabrous; spikelets on pedicels up to 0.5 mm long | . | . | . | . | . | . | . | . | . | 5. <i>E. interrupta</i> | |
| Plants generally pubescent; spikelets on pedicels more than 0.5 mm long | . | . | . | . | . | . | . | . | . | 6. <i>E. pubescens</i> | |
| 8. Spikelets on pedicels up to 0.5 mm long | . | . | . | . | . | . | . | . | . | . | 9 |
| Spikelets on pedicels more than 0.5 mm long | . | . | . | . | . | . | . | . | . | . | 10 |
| 9. Spikelets 1.5–2.5 mm wide; glumes narrowly ovate, 1–1.5 mm long | . | . | . | . | . | . | . | . | . | 7. <i>E. elongata</i> | |
| Spikelets 2–3.5 mm wide; glumes ovate, 1.3–2.5 mm long | . | . | . | . | . | . | . | . | . | 8. <i>E. sororia</i> | |
| 10. Spikelets \pm appressed to primary branches | . | . | . | . | . | . | . | . | . | 9. <i>E. spartinoides</i> | |
| Spikelets not appressed to primary branches | . | . | . | . | . | . | . | . | . | . | 11 |
| 11. Inflorescence branches with cilia in axils | . | . | . | . | . | . | . | . | . | 10. <i>E. mexicana</i> | |
| Inflorescence branches without cilia in axils | . | . | . | . | . | . | . | . | . | . | 12 |
| 12. Inflorescences up to 16 cm long, branches not weeping | . | . | . | . | . | . | . | . | . | 11. <i>E. brownii</i> | |
| Inflorescences 16–40 cm long, branches weeping | . | . | . | . | . | . | . | . | . | 12. <i>E. benthamii</i> | |
| 13. Inflorescences diffuse spreading panicles with spikelets of 2–5 florets solitary at ends of capillary branches; seed coats deep red, ridged | . | . | . | . | . | . | . | . | . | 13. <i>E. trachycarpa</i> | |
| Inflorescences not as above; seed coats not deep red, nor ridged | . | . | . | . | . | . | . | . | . | . | 14 |
| 14. Inflorescences \pm weeping | . | . | . | . | . | . | . | . | . | . | 15 |
| Inflorescences erect | . | . | . | . | . | . | . | . | . | . | 18 |
| 15. Lowest inflorescence branches whorled | . | . | . | . | . | . | . | . | . | . | 16 |
| Lowest inflorescence branches not whorled | . | . | . | . | . | . | . | . | . | . | 17 |
| 16. Annuals; glumes unequal, lower nerveless, ca 0.5 mm long | . | . | . | . | . | . | . | . | . | 14. <i>E. pilosa</i> | |
| Perennials; glumes subequal, lower 1-nerved, 0.7–1 mm long | . | . | . | . | . | . | . | . | . | 15. <i>E. parviflora</i> | |
| 17. Basal leaf sheaths glabrous, spikelets strongly laterally compressed; lemmas acute, 1.5–2 mm long | . | . | . | . | . | . | . | . | . | 16. <i>E. bahiensis</i> | |
| Basal leaf sheaths appressed silky hairy; spikelets not strongly laterally compressed; lemmas blunt, 1.8–2.5 mm long | . | . | . | . | . | . | . | . | . | 17. <i>E. curvula</i> | |
| 18. Inflorescences contracted; lemmas acute | . | . | . | . | . | . | . | . | . | 18. <i>E. megalosperma</i> | |
| Inflorescences loose open panicles; lemmas blunt | . | . | . | . | . | . | . | . | . | . | 19 |
| 19. Inflorescence branches ciliate in axils | . | . | . | . | . | . | . | . | . | 19. <i>E. tenuifolia</i> | |
| Inflorescence branches not ciliate in axils | . | . | . | . | . | . | . | . | . | . | 20 |
| 20. Pedicels encircled by a yellow band | . | . | . | . | . | . | . | . | . | 20. <i>E. leptostachya</i> | |
| Pedicels not encircled by a yellow band | . | . | . | . | . | . | . | . | . | . | 21 |
| 21. Pedicels delicate, 4–10 mm long | . | . | . | . | . | . | . | . | . | 21. <i>E. longipedicellata</i> | |
| Pedicels sturdy, up to 3 mm long | . | . | . | . | . | . | . | . | . | 22. <i>E. sp. 1.</i> | |

1. **Eragrostis cilianensis* (All.) Vign.-Lut. ex Janchen

STINKGRASS

Poa cilianensis All.; *Eragrostis major* (L.) Host; *E. megastachya* (Koel.) Link

Loosely tufted annual up to 90 cm tall; culms erect or ascending. Leaf sheaths often with tubercular-based hairs and verrucose glands along midrib; leaf blades linear, flat, attenuate, up to 25 cm \times 0.9 cm, usually with verrucose glands along margin, mostly glabrous. Panicles ovate, fairly dense, contracted, stiffly branched, 4–30 cm long, usually with glands on pedicels and branchlets; spikelets yellowish green to leaden grey, ovate to narrowly oblong, 0.3–3 cm \times 0.2–0.4 cm, florets 5–60; glumes subequal, ovate, acute or mucronate, boat-shaped, 1.5–2.5 mm long, 3-nerved, often glandular on keel and ciliate

towards margin; lemmas broadly ovate, obtuse or emarginate, (1.7–)2–3 mm long, 3-nerved, often glandular on keel and ciliolate towards margin and apex. **Fig. 26A.**

Native of Africa; naturalized in the Moreton, Darling Downs and Burnett districts, on a variety of soils.

2. *Eragrostis minor* Host

SMALLER STINKGRASS

Eragrostis pooides Beauv. as "*poaeoides*"

Loosely tufted annual up to 60 cm tall; culms ascending. Leaf sheaths often with verrucose glands and tubercular-based cilia; leaf blades linear-triangular, flat, up to 12 cm × 0.5 cm, glabrous or sprinkled with tubercular-based cilia, usually with a row of verrucose glands along margin or midvein. Panicles ovate or narrowly so, fairly dense, 4–20 cm long, stiffly branched, often with glands on pedicels and branchlets; spikelets yellowish green, leaden grey or purplish, very narrowly oblong to very narrowly ovate, 0.3–0.9(–1.5) cm × 0.1–0.3 cm, florets 6–16, rarely –40; glumes subequal, ovate, acute, 1–1.7 mm long, usually 1-nerved, often glandular on keel; lemmas broadly ovate, obtuse, 1.5–2 mm long, 3-nerved, often glandular on keel.

Native of warm temperate and subtropical regions of the Old World; naturalized weed in all districts of the region.

3. *Eragrostis lacunaria* F. Muell. ex Benth.

PURPLE LOVEGRASS

Eragrostis rankingii F. M. Bailey; *E. falcata* auct. non (Gaudich.) Benth.

Erect tufted perennial up to 60 cm tall; culms wiry. Leaf sheaths ciliate with long tubercular-based hairs; leaf blades linear, attenuate, up to 9 cm × 0.4 cm, ciliate with tubercular-based hairs or at length glabrous, minutely hispid. Panicles ovate, fairly dense, contracted, 4–20 cm long; spikelets purplish, linear-oblong, ± biconvex, 0.25–1.8 cm × 0.07–0.15 cm, florets 5–35; glumes subequal, ovate, acute or obtuse, 0.5–1.5 mm long, 1-nerved, usually minutely hispid on keel; lemmas broadly ovate, blunt, 1–2 mm long, often minutely hispid on keel. **Fig. 26B.**

Moreton, Darling Downs and Burnett districts, usually on sandy or stony soils in open forest.

4. *Eragrostis setifolia* Nees

NEVERFAIL GRASS

Eragrostis chaetophylla Steudel; *E. chaetophylla* var. *pauciflora* Benth.; *E. setifolia* var. *dubia* Domin

Densely tufted perennial up to 50 cm tall; base bulbous, usually woolly pubescent; culms slender, wiry. Leaf sheaths striate, often shortly ciliate along margin; leaf blades setiform, inrolled, up to 11 cm × 0.1–0.2 cm at base. Panicles narrow to narrowly ovate, fairly dense, (2–)4–11 cm long; spikelets pale green or greenish purple, ovate or narrowly ovate to linear-oblong, 0.3–2.4 cm × 0.2–0.3 cm, florets 5–57; glumes subequal, ovate, obtuse, 1–1.5 mm long, obscurely 1-nerved, ± glabrous, smooth; lemmas broadly ovate, obtuse, 1.5–2 mm long, 3-nerved, glabrous, occasionally minutely hispid towards apex. **Fig. 26C.**

Western parts of the Darling Downs district.

5. *Eragrostis interrupta* Beauv.

Eragrostis brownii (Kunth) Nees ex Steudel var. *interrupta* (R. Br.) Benth.; *E. australiensis* Domin

Tufted usually glaucous grass; culms prostrate, up to ca 1.8 m long. Leaf sheaths striate, glabrous; leaf blades linear, attenuate, up to 40 cm × 0.7 cm, glabrous, very minutely hispid. Panicles interrupted, few-branched, 30–90 cm long, spikelets usually crowded on branches, pedicels less than 0.5 mm long; spikelets mostly purplish, linear-elliptic to linear-oblong, 0.7–3.5 cm × 0.15–0.4 cm, florets 7–75; glumes subequal or unequal, narrowly ovate, acuminate, 1.5–2.5 mm long, 1-nerved, keel sometimes minutely hispid; lemmas broadly ovate, blunt, 2.5–4 mm long, 3-nerved, smooth or keel or upper part sometimes minutely hispid.

Moreton and Wide Bay districts, growing on sand along sea coasts.

6. *Eragrostis pubescens* (R. Br.) Steudel

Poa pubescens R. Br.; *Eragrostis brownii* (Kunth.) Nees ex Steudel var. *pubescens* (R. Br.) F. M. Bailey

Tufted perennial; culms obliquely ascending to sprawling, up to 1.2 m long. Leaf sheaths striate, pubescent with tubercular-based hairs; leaf blades linear, attenuate, up to 30 cm \times 0.4 cm, pubescent with tubercular-based hairs. Panicles loose, 8–50 cm long, often tubercular-pubescent, hispid, branchlets distant, often with tuft of hairs in axils, pedicels more than 0.5 mm long; spikelets pale greenish to purplish, narrowly elliptic to linear-oblong, 0.6–3.5 cm \times 0.2–0.4 cm, florets 7–56; glumes subequal, narrowly ovate, acute, 1.5–3 mm long, 1-nerved; lemmas broadly ovate, acute, 2.5–3.5 mm long, 3-nerved, glabrous, sometimes minutely hispid along keel.

Moreton and Wide Bay districts, usually on sandy soil, often near the sea.

7. *Eragrostis elongata* (Willd.) Jacq.**CLUSTERED LOVEGRASS**

Poa elongata Willd.; *P. diandra* R. Br.; *P. porrantha* Steudel; *Eragrostis diandra* (R. Br.) Steudel; *E. contigua* Jedw.; *E. diandra* var. *gillivrayi* Domin

Slender densely tufted perennial up to ca 75 cm tall. Leaf sheaths striate; leaf blades linear, attenuate, up to 27 cm \times 0.4 cm. Panicles narrow, 4–16 cm long, spikelets clustered on very short branches on pedicels less than 0.5 mm long; spikelets yellowish green to purplish, narrowly ovate to narrowly elliptic, occasionally narrowly oblong, 3–8 mm \times 1.5–2.5 mm, florets 5–19; glumes narrowly ovate, acuminate, 1–1.5 mm long, 1-nerved, sparsely hispidulous along keel; lemmas broadly ovate, acute or blunt, 1.5–2 mm long, 3-nerved, minutely hispid along keel and margin.

Recorded from all districts of the region, on a variety of soils.

8. *Eragrostis sororia* Domin

Slender tufted annual up to 60 cm tall; culms erect, wiry. Leaf sheaths striate, \pm glabrous or occasionally sparingly pilose; leaf blades linear, inrolled when dry, attenuate, up to 26 cm \times 0.3 cm, glabrous or occasionally sparingly pilose. Panicles narrow, contracted, rather dense, 2–25 cm long, pedicels up to 0.5 mm long; spikelets straw coloured to purplish, narrowly elliptic to narrowly oblong, 0.4–1.8 cm \times 0.2–0.35 cm, florets 6–40; glumes ovate, acuminate, subequal, 1.3–2.5 mm long, 1-nerved, minutely scabrous on keel; lemmas broadly ovate, acute, 1.5–2.5 mm long, minutely scabrous all over back, 3-nerved. **Fig. 26D.**

Recorded from all districts of the region, often on sandy soils in open forest.

9. *Eragrostis spartinoides* Steudel

Tufted perennial up to 90 cm tall; culms erect or lax. Leaf sheaths glabrous, striate; leaf blades linear, inrolled or sometimes flat, attenuate, up to 25 cm \times 0.3 cm, glabrous, minutely hispid on inner surface. Panicles narrow, fairly dense or open, 4–30 cm long, spikelets appressed to primary branches; spikelets whitish or greenish purple, narrowly ovate to linear-oblong, 0.4–2.3 cm \times 0.15–0.25 cm, florets 7–48; glumes subequal or lower shorter, narrowly ovate, acute, 1–2 mm long, obscurely 1-nerved, minutely hispid on keel; lemmas broadly ovate, acute to blunt, 1.7–2.5 mm long, 3-nerved, minutely hispid on keel.

Most districts of the region, often on sandy soils.

10. **Eragrostis mexicana* (Hornem.) Link**MEXICAN LOVEGRASS**

Poa mexicana Hornem.

Tufted annual up to 1.3 m tall; culms frequently with a ring of glandular depressions beneath nodes, sometimes coalescing to form a continuous band. Leaf sheaths sometimes with glandular depressions, sparingly pilose along upper margin; leaf blades linear, attenuate, up to 25 cm \times 0.7 cm, occasionally pilose below towards base. Panicles open, 10–40 cm long, sometimes with glandular depressions beneath nodes and on branches and pedicels, with a few white cilia in lower axils; spikelets yellowish green to purplish, narrowly or very narrowly ovate, 4–10 mm \times 1–2 mm, florets 5–15; glumes ovate, acute,

subequal to unequal, lower shorter, lower 0.7–1.2(–1.5) mm long, upper 1.5–2 mm long, 1-nerved, often minutely scabrous along keel; lemmas broadly ovate, acute to blunt, 1.5–2.5 mm long, 3-nerved, often minutely hispid towards apex.

Native of America; naturalized as a minor weed of Brisbane environs.

11. *Eragrostis brownii* (Kunth) Nees ex Steudel

BROWN'S LOVEGRASS

Poa brownii Kunth as "*brownei*"; *P. polymorpha* R. Br.; *Eragrostis urvillei* Steudel

Variable tufted perennial up to 40 cm tall; culms erect or ascending. Leaf sheaths often ciliate at orifice; leaf blades setaceous or narrow and flat, up to 22 cm × 0.3 cm, minutely hispid. Panicles loose and spreading or dense and contracted, 2–16 cm long, branches narrow, not weeping; spikelets yellowish green to purplish green, narrowly ovate to narrowly elliptic, 4–9 mm × 1.5–2.5 mm, florets 6–21; glumes subequal, ovate, acute, 1–2.5 mm long, 1-nerved, minutely scabrid along keel; lemmas broadly ovate, acute to blunt, 1.5–2 mm long, 3-nerved, minutely scabrid on keel and on back towards apex.

Recorded from all districts of the region.

12. *Eragrostis benthamii* Mattei

Eragrostis brownii (Kunth) Nees ex Steudel var. *patens* Benth.; *E. philippica* Jedw.; *E. rara* Domin

Tufted perennial up to ca 40 cm tall; culms erect or ascending. Leaf sheaths often ciliate at orifice; leaf blades very narrow or involute, attenuate, up to 20 cm × 0.3 cm, minutely hispid. Panicles loose and spreading, broader than in *E. brownii*, 16–40 cm long, branches capillary, weeping; spikelets mostly on long pedicels, lead grey or purplish, narrowly ovate to narrowly elliptic, 4–8 mm × 1.5–2 mm, florets 8–22; glumes subequal, ovate, acute, 1–2 mm long, 1-nerved, minutely scabrid on keel; lemmas broadly ovate, acute, ca 2 mm long, 3-nerved, generally smooth.

Recorded from the southernmost parts of the Darling Downs district.

This species is very closely related to *E. brownii*.

13. *Eragrostis trachycarpa* (Benth.) Domin

Eragrostis nigra Nees var. *trachycarpa* Benth.

Glabrous tufted ?annual up to 60 cm tall; culms erect. Leaves in a basal tuft; sheaths striate; blades linear, inrolled and filiform, attenuate, up to 20 cm × 0.3 cm, minutely hispid. Panicles diffuse, spreading, ovate, up to 40 cm long, branches long, capillary, spikelets solitary on tips; spikelets greenish purple to purplish, narrowly ovate, 2–5 mm × 0.7–1.2 mm, florets 2–5; glumes ovate, blunt, subequal or lower shorter, 1–1.8 mm long, 1-nerved, minutely hispid along keel; lemmas broadly ovate, blunt, 1.5–2 mm long, obscurely 3-nerved, occasionally minutely hispid towards keel apex. **Fig. 26E.**

Recorded from Stanthorpe and Wallangarra areas of the Darling Downs district, as a weed of disturbed sites.

14. **Eragrostis pilosa* (L.) Beauv.

SOFT LOVEGRASS

Poa pilosa L.

Loosely tufted annual up to 70 cm tall; culms erect or ascending. Leaf sheaths glabrous; leaf blades linear, flat, attenuate, up to 20 cm × 0.4 cm, glabrous. Panicles open, elliptic to ovate, 4–25 cm long, lowest branches whorled except in smallest panicles, capillary, usually with a few long white hairs in axils; spikelets purplish green, linear-ovate, 3–7 mm × 0.7–1.5 mm, florets 4–14; glumes unequal, lower narrowly ovate, ca 0.5 mm long, nerveless, upper ovate, acute, 1–1.5 mm long, 1-nerved; lemmas broadly ovate, blunt to subacute, 1.3–2 mm long, obscurely 3-nerved, minutely scabrid along keel. **Fig. 26F.**

Native of tropical and warm temperate regions of the world; naturalized in disturbed sites in most districts of the region.

15. *Eragrostis parviflora* (R. Br.) Trin.

WEeping LOVEGRASS

Poa parviflora R. Br.; *E. pellucida* (R. Br.) Steudel; *Eragrostis pilosa* auct. non (L.) Beauv.

Tufted perennial up to 90 cm tall; culms erect or ascending, usually slender, glabrous.

Leaves mostly arising from near base; sheaths striate; blades narrow, flat or inrolled, attenuate, up to 35 cm \times 0.4 cm, minutely hispid. Panicles open, spreading, often slightly nodding, elliptic or ovate, 15–45 cm long, branchlets capillary, lowermost often \pm whorled; spikelets greenish to purplish, linear-ovate to linear-oblong, 0.3–1.1 cm \times 0.08–0.15 cm, florets 4–19; glumes ovate, blunt, subequal, lower 0.7–1 mm long, upper 1–1.5 mm long, obscurely 1-nerved; lemmas broadly ovate, obtuse to blunt, 1.2–1.7 mm long, obscurely 3-nerved.

Recorded from all districts of the region on a variety of soils, often a weed of disturbed sites or cultivation.

16. **Eragrostis bahiensis* Schrader

Loosely tufted annual up to 1 m tall; culms \pm erect. Leaf sheaths glabrous; leaf blades linear, attenuate, up to 25 cm \times 0.4 cm, minutely hispid on upper surface. Panicles spreading, loose, ovate, 10–27 cm long, branches slender; spikelets yellowish grey to purplish grey, narrowly ovate to narrowly oblong, 4–8 mm \times 1.5–2 mm, florets 5–25; glumes subequal, ovate, acute, 1.1–1.8 mm long, obscurely 1–3-nerved, minutely hispid on keel; lemmas broadly ovate, acute, 1.5–2 mm long, obscurely 3-nerved, minutely hispid on keel. **Fig. 26G.**

Native of the Americas; naturalized in the Moreton district on sandy soil.

17. **Eragrostis curvula* (Schrader) Nees

AFRICAN LOVEGRASS

Poa curvula Schrader; *Eragrostis chloromelas* Steudel

Densely tufted perennial up to 1.2 m tall; culms slender or robust, usually erect. Basal leaf sheaths strongly striate, appressed silky hairy below; blades linear, usually rolled or filiform, attenuate, up to 30 cm \times 0.3 cm, minutely hispid. Panicles very variable, loose and spreading to narrow and contracted, 6–30 cm long, usually ciliate in axils; spikelets grey-green, linear-oblong or linear-elliptic, 3–10 mm \times 1–1.5 mm, florets 4–13; glumes narrowly ovate, acute, 1-nerved, lower 1–2 mm long, upper 1.5–2.2 mm long; lemmas ovate-elliptic, blunt, 1.8–2.5 mm long, obscurely 3-nerved.

Native of South Africa; naturalized in all districts of the region, often along roadsides.

18. *Eragrostis megalosperma* F. Muell. ex Benth.

Sporobolus indicus R. Br. var. *intermedius* F. M. Bailey

Densely tufted slender perennial up to 90 cm tall; culms wiry, arising from short rhizome. Leaf sheaths glabrous, striate; leaf blades linear, attenuate, up to 25 cm \times 0.2 cm, glabrous, minutely hispid. Panicles narrow, contracted, dense, 5–30 cm long, spikelets purplish green, linear-oblong or linear-ovate, 0.5–1.4 cm \times 0.1–0.2 cm, florets 5–21, slender, not tightly overlapping; glumes subequal, narrowly ovate, blunt to acute, 1–1.7 mm long, 1-nerved, glabrous, rarely minutely hispid; lemmas ovate, acute, 1.5–2.5 mm long, glabrous, obscurely 3-nerved. **Fig. 26H.**

Recorded from most districts of the region, usually in open forest, often in brigalow areas.

19. **Eragrostis tenuifolia* (A. Rich.) Hochst. ex Steudel

ELASTIC GRASS

Poa tenuifolia A. Rich.

Tufted annual or short-lived perennial up to 70 cm tall; culms erect. Leaf sheaths somewhat keeled, striate, margin softly ciliate; leaf blades linear, flat, attenuate, up to 30 cm \times 0.3 cm. Panicles narrowly elliptic, erect, 5–30 cm long, branches long, capillary, with tuft of hairs in the axils, sometimes with glandular ring; spikelets dark green or greenish grey, initially linear-ovate, later with a saw-toothed outline, 0.4–1.6 cm \times 0.1–0.3 cm, florets 4–16; glumes narrowly ovate, unequal, lower 0.5–1 mm long, upper 0.8–1.5 mm long, obscurely 1-nerved; lemmas broadly ovate, blunt, 2–2.5 mm long, obscurely 3-nerved, often strongly keeled towards apex, keel smooth. **Fig. 26I.**

Native of tropical areas; a naturalized weed of most districts of the region.

20. *Eragrostis leptostachya* (R. Br.) Steudel

PADDOCK LOVEGRASS

Poa leptostachya R. Br.

Slender tufted perennial up to 75 cm tall; culms erect or ascending. Leaf sheaths glabrous or occasionally margin ciliate with tubercular-based hairs; leaf blades linear, attenuate,



Fig. 26 POACEAE — *Eragrostis* spp. — A *E. cilianensis*, part leaf showing tubercular glands on midvein x 6; B *E. lacunaria*, spikelet showing biconvex sides x 6; C *E. setifolia*, bulbous base x 1; D *E. sororia*, part inflorescence showing spikelets on very short pedicels x 3; E *E. trachycarpa*, seed x 25; F *E. pilosa*, spikelet showing unequal glumes x 6; G *E. bahiensis*, 2 views showing strongly laterally compressed spikelet x 6; H *E. megalosperma*, contracted inflorescence x 1; I *E. tenuifolia*, spikelet at maturity x 6; J *E. leptostachya*, part inflorescence showing pedicels with yellow bands (arrowed) x 3.

up to 22 cm \times 0.3 cm, often sprinkled with tubercular-based soft hairs. Panicles narrow, 10–25 cm long, branchlets few, spreading, spikelets few–several per branch, pedicels encircled by a yellow band (sometimes obscure); spikelets greenish purple, narrowly ovate to narrowly oblong, 3–10 mm \times 1–2 mm, florets 4–20; glumes subequal to unequal, ovate, acute or blunt, 1–1.5 mm long, 1-nerved, sometimes minutely hispid along keel; lemmas broadly ovate, blunt, 1.2–2.2 mm long, 3-nerved, usually smooth. **Fig. 26J.**

Recorded from all districts of the region, usually on sandy soils in open forest.

21. *Eragrostis longipedicellata* B. Simon

Tufted perennial up to 80 cm tall; culms slender, with slightly swollen butt at base. Leaf sheaths striate, pilose with tubercular-based hairs; leaf blades linear, terete, filiform, up to 10 cm long, sparsely pilose, arising mostly from base of culm. Panicles open, divaricate, 9–18 cm long, with long branches and pedicels; spikelets purplish to yellowish, narrowly ovate to narrowly oblong, 0.4–1.4 cm \times 0.15–0.2 cm, florets 7–23; glumes subequal, or lower slightly shorter, ovate, acute to blunt, 0.75–1.5 mm long, 1-nerved, minutely scabrid on keel; lemmas broadly ovate, blunt, 1.5–2 mm long, 3-nerved, often minutely scabrid towards apex.

Darling Downs and Burnett districts, often on stony soils in open forest.

22. *Eragrostis* sp. 1.

Eragrostis molybdea auct. non Vickery, Vickery

Tufted perennial up to 80 cm tall; culms ascending, often geniculate and branching from lower nodes, smooth. Leaf sheaths loose, glabrous or with a few tubercular-based hairs; leaf blades linear, \pm involute when dry, attenuate, up to 15 cm \times 0.2–0.3 cm, glabrous or with sparse tubercular-based hairs on margin, minutely scabrous above. Panicles ovate, up to 40 cm long, branches few, distant, \pm horizontal, stiff, pedicels up to 3 mm long; spikelets purplish grey to straw coloured, linear-ovate, 0.7–1.3(–2.2) cm \times 0.15–0.2 cm, florets 6–31; glumes unequal, lower narrowly oblong, obtuse, ca 1.5 mm long, obscurely 1-nerved, upper broadly ovate, obtuse, ca 1.75 mm long, 1-nerved; lemmas broadly ovate, obtuse, 2–2.8 mm long, strongly 3-nerved, smooth or sometimes minutely scabrid towards apex.

Mainly western parts of the region.

Current research indicates that the holotype of *E. molybdea* Vickery is acutally a specimen of *E. leptostachya*. This taxon therefore will require a new name.

56. DIPLACHNE Beauv.

Aquatic or semi-aquatic rhizomatous perennials. Ligules membranous; leaf blades linear, often inrolled. Inflorescences open, composed of several–numerous racemes scattered along central axis, racemes slender, straight or flexuous, secund; spikelets solitary, biserial, sessile or shortly pedicellate, disarticulating between florets, florets 4–14, bisexual; glumes persistent, membranous, unequal, shorter than lemmas, 1-nerved, keeled.

15 species tropical and subtropical; 3 species Australia; 2 species south-eastern Queensland.

- | | |
|---|-------------------------|
| 1. Spikelets grey-green or olive-green, 0.8–2 cm long with 8–14 florets | 1. <i>D. fusca</i> |
| Spikelets pale green, usually 0.6–0.8 cm long with 5 or 6 florets | 2. <i>D. parviflora</i> |

1. *Diplachne fusca* (L.) Beauv. ex Roemer & Schultes BROWN BEETLE GRASS
Festuca fusca L.; *Leptochloa fusca* (L.) Kunth. *Diplachne repatrix* (L.) Druce; *D. muelleri* Benth.

Rhizomatous perennial up to 1.5 m tall, rooting and branching from lower nodes. Leaves mostly basal; ligules acute or lacinate, 3–8 mm long; leaf blades linear, inrolled or rarely flat, attenuate, 25–55 cm \times 0.15–0.8 cm, minutely scabrous. Inflorescences 20–40 cm long, initially compact, later spreading; racemes 10–30, slender, straight, 7–15 cm long; spikelets grey-green or olive-green, usually slightly overlapping, narrowly elliptic,

0.8–1.5 cm long, florets 6–11; glumes scabrid on their keels, lower glume narrowly ovate, acute or acuminate, 2–*ca* 4.5 mm long, upper glume narrowly oblong, acute or obtuse, mucronulate, 3–7.5 mm long; lemmas narrowly oblong, 3–6 mm long, pilose on lower part of nerves, 2- or more-toothed and mucronate or shortly awned from sinus, awn *ca* 0.5–1.5 mm long. **Fig. 27B.**

Recorded from Moreton and Darling Downs districts, usually in moist or seasonally wet areas, e.g. roadside ditches, edges of swamps or melon holes, or in drainage lines.

2. *Diplachne parviflora* (R. Br.) Benth.

BEETLE GRASS

Triodia parviflora R. Br.

Erect tufted perennial up to 80 cm tall, branching at lower nodes. Leaves mostly basal; ligules often lacinate, 1–5 mm long; leaf blades linear, inrolled or rarely flat, attenuate, 5–20 cm × 0.1–0.5 mm, scabrous. Inflorescences 20–30 cm long, racemes 3–13 cm long; spikelets pale green, usually slightly overlapping, narrowly elliptic, 6–8 mm long, florets 5–7; glumes 1-nerved, scabrid on nerve, lower glume narrowly ovate, acute or blunt, *ca* 2–2.5 mm long, upper glume narrowly oblong, acute or blunt, 3–4 mm long; lemmas narrowly oblong, *ca* 3–4.5 mm long, pilose on lower part of midrib, 2- or more-toothed and mucronulate or shortly awned from sinus, awn *ca* 0.5–1 mm long.

Recorded from Moreton, Wide Bay and Darling Downs districts, in drainage areas, lakesides, swamps etc.; not common.

57. LEPTOCHLOA Beauv.

Tufted or rhizomatous annuals or perennials. Ligules membranous, short, usually fimbriate; leaf blades linear or narrow, usually flat. Inflorescences open, consisting of several–many slender secund racemes scattered along central axis; spikelets solitary, laterally compressed, usually overlapping, biseriate, disarticulating between florets, florets few–several, rarely 1; glumes subequal, usually shorter than lemmas, membranous, keeled, 1-nerved, persistent; lemmas broadly ovate or ovate-elliptic, obtuse or mucronate, entire or emarginate, membranous, keeled, 3-nerved, minutely hairy along nerves; paleas nearly as long as lemmas, hyaline, 2-keeled, keels ciliate; stamens 2 or 3; ovary glabrous, styles distinct, stigmas plumose. Caryopses trigonous or dorsally compressed or terete, closely enclosed by lemma and palea.

27 species, tropical and subtropical; 8 species Australia; 6 species south-eastern Queensland.

- | | | |
|--|------------------------------|---|
| 1. Robust wiry grass mostly 1–2 m tall; culms hard, woody; racemes subdigitate | 1. <i>L. digitata</i> | |
| Robust or slender grass usually less than 1 m tall; culms soft, compressible; racemes not subdigitate, axis of inflorescence longer than racemes | | 2 |
| 2. Glumes ± as long as spikelet; annuals with inflorescences more than half length of culm | 2. <i>L. filiformis</i> | |
| Glumes much shorter than spikelet; perennials with inflorescences much less than half length of culm | | 3 |
| 3. Panicles effuse, open, up to 30 cm wide; racemes stiff, widely spreading to deflexed | 3. <i>L. divaricatissima</i> | |
| Panicles contracted, loose or congested, much less than 30 cm wide; racemes flaccid, erect or drooping | | 4 |
| 4. Leaves pilose; lemmas densely bearded along margin with hairs 0.5–1 mm long | 4. <i>L. peacockii</i> | |
| Leaves ± glabrous; lemmas ciliolate along margin with hairs less than 0.5 mm long | | 5 |
| 5. Racemes bearing spikelets to or almost to base; spikelets (4–)5–6 mm long | 5. <i>L. decipiens</i> | |
| Racemes not bearing spikelets almost to base; spikelets 2.5–3.5(–5) mm long | 6. <i>L. ciliolata</i> | |

1. *Leptochloa digitata* (R. Br.) Domin**UMBRELLA CANEGRASS**

Poa digitata R. Br.; *Eleusine digitata* (R. Br.) Sprengel; *Leptochloa subdigitata* Trin. ex Steudel; *E. polystachya* F. Muell.

Robust tussock forming often rhizomatous perennial 1.2–3 m tall; culms cane-like, simple or branched, glaucous and usually pruinose, with several thickened nodes. Leaf sheaths broad and loose; ligules fimbriate, *ca* 1 mm long; blades linear, usually flat, attenuate, up to 22 cm × 0.7 cm, margin thickened, minutely scabrous. Inflorescences usually subdigitate, congested, axis less than 5 cm long, racemes 2–13 cm long; spikelets 2.5–4(–5) mm long, (3–)5–6(–8)-flowered; glumes unequal, acute to acuminate, minutely scabrous or smooth, lower narrowly ovate, 1–1.5 mm long, upper ovate-oblong, 1.5–2 mm long; lowest lemma oblong-ovate, obtuse to subtruncate, entire to emarginate, 1.5–2 mm long, glabrous.

Recorded from Darling Downs, Burnett and Wide Bay districts, usually along watercourses and flood plains where it often forms conspicuous bamboo-like stands.

2. **Leptochloa filiformis* (Lam.) Beauv.**RED SPRANGLETOP**

Festuca filiformis Lam.

Robust annual up to 1.2 m tall; culms striate or grooved, simple or sparsely branched. Leaf sheaths loose, sparsely or densely pilose; ligules fimbriate, 1–2 mm long; leaf blades linear, flat, attenuate, up to 20 cm × 1.4 cm, glabrous or pilose in lower part, margins minutely scabrous. Inflorescences loose to open, 10–50 cm long, *ca* half as long as plant, racemes 5–15 cm long; spikelets 2–3 mm long, florets 3 or 4; glumes ± equal, 1.5–2 mm long, lower narrowly ovate, acuminate, upper ovate, acute; lowest lemma ovate-elliptic, obtuse, emarginate, 1–1.5 mm long, pubescent about midnerve and near margin. **Fig. 27C.**

Native of America; naturalized in Moreton and Wide Bay districts in disturbed areas, usually on sandy loam.

3. *Leptochloa divaricatissima* S. T. Blake

Tufted perennial up to 60 cm tall; culms simple or sparsely branched, glabrous or pubescent. Leaf sheaths tight; ligules often lacinate, 1–3 mm long; leaf blades linear, attenuate, up to 30 cm × 0.5 cm, glabrous, minutely scabrous. Inflorescences open, 15–60 cm long, racemes up to 20 cm long; spikelets 3–4 mm long, florets 3–5; glumes unequal, lower narrowly ovate, acuminate, 1–1.5 mm long, upper narrowly oblong to ovate, acute, *ca* 2 mm long; lowest lemma narrowly oblong, obtuse, emarginate, 2–2.5 mm long, pubescent about midnerve in lower part, ciliate on margin.

Recorded from Darling Downs district, mainly on heavy-textured soils subject to periodic flooding.

4. *Leptochloa peacockii* (Maiden & Betcher) Domin

Diplachne peacockii Maiden & Betcher

Tufted perennial up to 1.2 m tall, rarely more; culms simple to sparsely branched. Leaf sheaths rather loose, pilose with weak tubercular-based hairs; ligules 1.5–2 mm long; leaf blades linear, attenuate, up to 20 cm × 0.5 cm, pilose, often densely so, with weak tubercular-based hairs, densely scabrous. Inflorescences 10–40 cm long, racemes 5–14.5 cm long; spikelets 4–7 mm long, florets 4–6, rarely 3; glumes unequal, lower narrowly ovate, acuminate, 1–2 mm long, upper obovate, subacute to obtuse, 1.5–2.5 mm long; lowest lemma oblong-elliptic, obtuse to truncate, 2–2.5 mm long, densely bearded along margin with hairs 0.5–1 mm long, longer than width of internodes.

Recorded from Burnett and Darling Downs districts, mainly in brigalow areas, with one record from western Moreton district.

5. *Leptochloa decipiens* (R. Br.) Stapf ex Maiden**SLENDER CANEGRASS**

Poa decipiens R. Br.; *Leptochloa decipiens* (R. Br.) Druce; *P. imbecilla* R. Br.; *P. asthenes* Roemer & Schultes; *Eragrostis decipiens* (R. Br.) Steudel; *E. imbecilla* Steudel; *L. asthenes* (Roemer & Schultes) Hubbard

Tufted perennial up to 1.2 m tall, rarely more; culms simple to sparsely branched. Leaf sheaths rather loose, ± glabrous; ligules 1.5–2 mm long; leaf blades linear, attenuate, up to *ca* 20 cm × 0.5 cm, ± glabrous, densely scabrous. Inflorescences 10–30 cm long,

racemes 5–14.5 cm long; spikelets usually 4–6 mm long, florets 4–6, rarely –9; glumes unequal, lower narrowly ovate, acuminate, 1–2 mm long, upper obovate, subacute to obtuse, 1.5–2.5 mm long; lowest lemma oblong-elliptic, obtuse to truncate, 2–2.5 mm long, margin with hairs up to 0.4 mm long, shorter than width of internerves.

Scattered throughout the region, usually on flood plains, creek banks, near lakes etc.

6. *Leptochloa ciliolata* (Jedw.) S. T. Blake

Eragrostis ciliolata Jedw.; *E. imbecilla* Benth.; *Leptochloa debilis* Stapf ex C. E. Hubbard

Densely tufted perennial; culms thin, wiry, strongly branched. Leaf sheaths tight; ligules fimbriate, 0.5–1.5 mm long; leaf blades linear, often flat, attenuate, up to 8 cm × 0.3 cm, glabrous or sometimes pilose near ligule, minutely scabrous. Inflorescences open, 4–15(–30) cm long, racemes 1.5–10 cm long, axis and pedicels filiform; spikelets 2.5–3.5(–5) mm long, florets 3 or 4, rarely –7; glumes unequal, minutely scabrous, lower narrowly ovate, acute, 0.5–1.5 mm long, upper narrowly ovate to elliptic-oblong, obtuse, emarginate, 1–2 mm long; lowest lemma ovate or oblong, obtuse, emarginate, 1.5–2.5 mm long, pubescent or ciliate about midnerve, or ± glabrous, minutely scabrous near apex and on keel. **Fig. 27D.**

Scattered throughout the region, on a range of soil types, usually in open forest.

58. ELEUSINE Gaertn.

Tufted annuals or tussocky perennials from short ascending rhizome; culms slender to robust, flattened. Leaf sheaths keeled; ligules membranous, truncate, often ciliate; leaf blades linear, usually folded. Inflorescences digitate or shortly racemose, composed of a number of secund spikes clustered at top of culm; spikelets solitary, laterally compressed, biseriate, usually closely overlapping, disarticulating between florets, florets several; glumes subequal, shorter than lemmas, membranous, 1–several-nerved, persistent; lemmas elliptic to oblong, obtuse to acute, entire, membranous, glabrous, keeled, usually 3-nerved; paleas slightly shorter than lemmas, 2-keeled, keels winged; stamens glabrous; styles slender from thickened base, distinct, stigmas plumose. Caryopses broadly obloid to globose, broadly grooved, enclosed within free hyaline pericarp.

9 species tropical and subtropical; 3 species introduced Australia; 2 species south-eastern Queensland.

1. Plants up to 20 cm tall; spikes up to 3 cm long; spikelets densely crowded on spikes

1. *E. tristachya*

- Plants 30–60 cm tall; spikes 3–15.5 cm long; spikelets loosely overlapping on spikes

2. *E. indica*

1. **Eleusine tristachya* (Lam.) Lam.

GOOSE GRASS

Cynosurus tristachyus Lam.

Tufted annual up to 20 cm tall; culms oblique or ascending. Leaf sheaths keeled; ligules ciliate, ca 0.5 mm long; leaf blades linear, obtuse, 2–20 cm × 0.2–0.4 cm, glabrous, minutely scabrous on margin, particularly towards apex. Inflorescences of 2–5 digitate or subdigitate spikes 1–3 cm long, axes flattened; spikelets crowded, 3–7 mm long, florets 3–11, bisexual; glumes unequal, lower ovate, acute to blunt, 1.5–2.5 mm long, 1-nerved, upper ovate-elliptic, blunt, 2.5–3 mm long, ± 3-nerved; lemmas acute, 3.5–4 mm long, 3–5-nerved, keeled. **Fig. 27E.**

Native of South America; naturalized in southern districts of the region.

2. **Eleusine indica* (L.) Gaertn.

CROWSFOOT GRASS

Cynosurus indicus L.; *Eleusine indica* var. *monostachya* F. M. Bailey

Coarse tufted annual 30–60 cm tall; culms ascending or prostrate. Leaf sheaths keeled; ligules 0.5–1 mm long; leaf blades linear, obtuse, 3–35 cm × 0.3–0.8 cm, glabrous, minutely scabrous on margin. Inflorescences of 1–15 digitate or subdigitate spikes 3.5–15.5 cm long, often 1–few spikes set below main apical cluster; spikelets 3.5–7 mm long, laterally compressed, florets 3–9, bisexual; glumes unequal, lower narrowly ovate,

± acute, 1.5–3.5 mm long, 1-nerved, upper narrowly ovate-elliptic, ± acute, 2.5–4.5 mm long, ± 3–5-nerved; lemmas acute, 2.5–4.5 mm long, 3–5-nerved, keeled.

Pantropical weed, origin obscure; common weed throughout the region. Can be poisonous to stock under certain conditions.

59. *DACTYLOCTENIUM* Willd.

Tufted or stoloniferous annuals or perennials. Ligules membranous, truncate, often ciliolate. Inflorescences digitate, composed of several linear to narrowly oblong secund spikes which ± disarticulate at maturity from the top of culm, uppermost spikes abortive, spike terminating in a pointed extension of flattened rachis; spikelets solitary, elliptic or ovate, laterally compressed, biseriate, closely overlapping, disarticulating above glumes but not between lemmas, florets several, bisexual; glumes subequal, shorter than lemmas, 1-nerved, keeled, persistent, lower sharply acute, upper awned from just below emarginate tip; lemmas membranous, tip entire, acute to shortly awned, membranous, keeled, 3-nerved, lateral nerves obscure; paleas nearly as long as lemmas, 2-keeled, keels sometimes winged; stamens 3; ovary glabrous, styles distinct. Caryopses subglobose to subangular, ornamented, enclosed within free hyaline pericarp which ruptures to release grain.

10–13 species, warm regions, mainly Africa and India; 4 species Australia, 3 species introduced; 3 species south-eastern Queensland.

- | | | |
|---|------------------------|---|
| 1. Vigorously stoloniferous perennials | 1. <i>D. australe</i> | |
| Tufted annuals, sometimes rooting from lower nodes | | 2 |
| 2. Spikes 3–10, 0.5–1.5 cm long; spikelets ca 5 mm long | 2. <i>D. radulans</i> | |
| Spikes 2–7, 1–6.5 cm long; spikelets 2.5–4 mm long | 3. <i>D. aegyptium</i> | |

1. **Dactyloctenium australe* Steudel

SWEET SMOTHER GRASS

Stoloniferous perennial; culms slender, erect or geniculately ascending, up to 80 cm tall. Ligules ca 0.5 mm long; leaf blades tapered, flat, acuminate, 5–27 cm × 0.2–0.5 cm, softly pilose with spreading tubercular-based hairs, especially on lower surface. Inflorescences of 3–6 spikes, 3–5 cm long; spikelets elliptic-oblong, 4–5 mm long, florets 4–6; lower glume ovate, truncate with diverging mucro, 1.5–2 mm long, upper glume oblong-elliptic, obtuse, 1.5–2 mm long, keel extended into awn 1–3 mm long; lemmas ovate, tips flexuose, acuminate-aristulate, 2.5–3.5 mm long, keel scabrid above middle, extended into awn 0.5–0.75 mm long.

Native of South Africa; naturalized in Moreton, Wide Bay and Burnett districts. Useful as a lawn grass in shady areas, though rarely sown due to lack of commercially available seed.

2. *Dactyloctenium radulans* (R. Br.) Beauv.

BUTTON GRASS

Eleusine radulans R. Br.; *E. aegyptia* auct. non (L.) Desf., Benth.; *Dactyloctenium australiense* Scribner

Short slender annual; culms decumbent, ascending or rarely erect, branched, up to ca 20 cm tall. Ligules ca 0.5 mm long; leaf blades tapered, flat, attenuate, 2.5–12 cm × 0.2–0.6 cm, usually with long tubercular-based hairs along margin of lower part. Inflorescences of 3–10 spikes, 0.5–1.2(–1.5) cm long; spikelets ca 5 mm long, florets 2–4; lower glume narrowly ovate, acute, 1–2 mm long, keel thick, scabrid, upper glume oblong-elliptic, obtuse, 1.5–3 mm long, keel extended into stout awn 1–2.5 mm long; lemmas ovate, blunt, 3–4 mm long, keel minutely scabrid, extended into awn ca 0.5 mm long.

Darling Downs, Burnett and western Moreton districts. Can be poisonous to stock under certain conditions.

3. **Dactyloctenium aegyptium* (L.) Willd.

COAST BUTTON GRASS

Cynosurus aegyptius L.; *Eleusine aegyptia* (L.) Desf.; *Chloris mucronata* Michaux; *Dactyloctenium mucronatum* (Michaux) Willd.; *D. figarei* De Not.; *D. aegyptium* var. *mucronatum* (Michaux) Schweinf.; *Cynosurus ciliaris* J. D. Hook.; *D. ciliare* Choiv.

Slender to moderately robust spreading annual; culms usually geniculately ascending and

rooting at lower nodes, up to 70 cm tall. Ligules 0.5–1 mm long; leaf blades tapered, flat, attenuate, 3–25 cm \times 0.2–0.8 cm, usually pilose with tubercular-based hairs particularly along margin, minutely papillose-hispid. Inflorescences of 1–9 spikes, 1.2–6.5 cm long; spikelets broadly ovate, 2.5–4 mm long, florets 3–4; lower glume ovate, acute, 1.5–2 mm long, keel thick, scabrid, upper glume oblong-elliptic, obtuse, 1.5–2.2 mm long, keel minutely hispid, extended into stout divergent awn 1–2(–2.5) mm long; lemmas ovate, acuminate, 2.5–3 mm long, keel gibbous, concave and scabrid above middle, extended into stout mucro up to 1 mm long. **Fig. 27F.**

Native of tropical and warm temperate regions of the Old World; naturalized in coastal districts of the region.

60. *TRIOGON* Roemer & Schultes

Slender densely tufted perennials; culms erect or pendulous, usually unbranched. Leaves mainly basal; ligules a narrow ciliate membrane; leaf blades narrow, usually filiform. Inflorescences a solitary terminal subsecund spike; spikelets linear to elliptic, laterally compressed, biseriate, overlapping and \pm appressed to rachis, disarticulating between lemmas, florets 3–many; glumes narrow, unequal, usually shorter than lemmas, 1-nerved or rarely upper 3-nerved, keeled, persistent; lemmas membranous, tip 2-toothed or subentire, sometimes with additional lobes between teeth, mucronate or 1–3-awned, 3-nerved, rounded or obtusely keeled, glabrous; paleas usually winged and ciliate along margin; callus villous; stamens 3; styles very short. Caryopses narrow, trigonous to almost terete.

20 species tropical Africa and Asia; 1 species Australia, occurring in south-eastern Queensland.

1. *Triogon loliiformis* (F. Muell.) C.E. Hubbard

FIVE MINUTE GRASS; RYE
BEETLE GRASS

Festuca loliiformis F. Muell.; *Diplachne loliiformis* (F. Muell.) F. Muell. ex Benth.

Small tufted erect annual or short-lived perennial; culms simple, slender, numerous, 5–30 cm tall. Ligules ciliate, *ca* 0.5 mm long, longer cilia at each end of orifice; leaf blades linear, flat or convolute, attenuate or sometimes obtuse, 1.5–8 cm \times *ca* 0.05–0.1 cm, sprinkled with long weak hairs, sometimes densely so, or sometimes glabrous, scabrous. Inflorescences erect or curved spikes 2–12 cm long, scapes \pm as long as spikes; spikelets separately oriented and \pm distinct, \pm adpressed and borne with edges of glumes towards rachis, up to 1.4 cm \times 0.2 cm, florets numerous; glumes unequal, lower narrow, acute, somewhat asymmetrical, 1.5–2 mm long, 1-nerved, upper narrow, blunt, 2–3 mm long, 3-nerved; lemmas \pm ovate, apex shortly bluntly bilobed, 2–3 mm long, 3-nerved with central nerve extended into fine awn up to 1 mm long. **Fig. 27H.**

Scattered throughout the region, often on hilltops or amongst rocks or rocky ledges.

There is a great deal of variation in this species and there may be a number of taxa grouped under this name.

61. *THELLUNGIA* Stapf

Slender perennials. Ligules reduced to ciliate margin; leaf blades narrow, convolute. Inflorescences spiciform panicles; spikelets paired on short branchlets appressed along common axis, one of each pair pedicellate, other sessile, rachilla tardily disarticulating above glumes and between florets, florets 2–4, bisexual; glumes subequal or unequal, membranous, 1-nerved, keeled, lower persistent, upper deciduous; lemmas membranous, keeled; paleas much shorter than lemmas, thinly 2-keeled, subuplicate between keels; stamens 3; ovary glabrous, stigmas short, plumose, Caryopses free, pericarp thin; seeds laterally compressed, cuneate in transverse section.

1 species Australia, occurring in south-eastern Queensland.

1. *Thellungia advena* Stapf

COOLIBAH GRASS

Eragrostis advena (Stapf) Phillips

Tufted robust perennial; culms erect, up to 1.5 m tall, unbranched. Leaves mostly basal;

ligule cilia up to 0.5 mm long; leaf blades linear, convolute, attenuate, up to 30 cm \times 0.5 cm, striate, minutely hispid. Spike-like panicles 25–50 cm or more long, branches mostly 1–2 cm long, 1–several spikelets per branch; spikelets 3–4 mm long; glumes narrow, acute, lower 1.5–2 mm long, upper 2–3 mm long; lemmas narrowly ovate, acute, 2–3 mm long, strongly keeled. **Fig. 271.**

Darling Downs district, apparently restricted to heavy textured soils particularly in low lying areas.

62. *TRIODIA* R. Br.

Coarse tussock or hummock forming perennials. Leaf sheaths often viscid and resinous, \pm pubescent; ligules reduced to ciliate rim; leaf blades subulate, pungent, folded in bud. Inflorescences open or contracted panicles, or rarely spikes; spikelets solitary, pedicellate, laterally compressed, disarticulating above glumes and between lemmas, florets numerous, bisexual or sometimes uppermost sterile; glumes acuminate, subequal, keeled, 1–several-nerved; lemmas leathery, rounded on back, 3-nerved or with several nerves in 3 groups, terminating in 3 lobes or teeth, nerves more prominent towards apex; paleas 2-keeled, keels usually ciliolate; stamens 3; ovary glabrous, styles short, stigmas plumose. Caryopses oblong in outline, slightly compressed or subtrigonal, enclosed in but free from lemma and palea.

35 species endemic in Australia; 3 species south-eastern Queensland.

- | | | |
|---|-------------------------|---|
| 1. Leaf sheaths not resinous, not thickened so that culms do not appear flattened; apex of lemma not deeply lobed | <i>T. irritans</i> var. | |
| Leaf sheaths usually resinous, thickened so that culms appear flattened; apex of lemma lobed to at least $\frac{1}{4}$ length of lemma | 1. <i>laxispicata</i> | 2 |
| 2. Lemmas lobed to ca $\frac{1}{3}$ of their length; margins of lateral lobes thin and scarious but border not extending to base of lemma | 2. <i>T. mitchellii</i> | |
| Lemmas lobed to ca $\frac{1}{4}$ of their length; margins of lateral lobes with broad scarious edge curving to base of lemma | 3. <i>T. marginata</i> | |

1. *Triodia irritans* R. Br. var. *laxispicata* N. T. Burbidge

PORCUPINE GRASS

Perennial forming large glaucous tussocks which may die away from centre leaving rings of living culms; glabrous or glaucous. Leaf sheaths glabrous or sometimes sparsely to moderately pilose, not flattened; ligule cilia up to 0.5 mm long; leaf blades linear, inrolled, rigid and pungent pointed, up to 30 cm \times 0.2 cm, minutely scabrous on margin and inner surface. Panicles narrow, up to 30 cm long, branches slender; spikelets 0.9–1.6 cm long, florets 4–7; glumes narrowly ovate, blunt to acuminate, \pm equal, 4.5–8 mm long, stiff, usually minutely scabrous, 1–3 nerves visible; lemmas ovate, obtuse, apex ragged, subtruncate or emarginate, 4–6 mm long, villous with silky hairs at base, along lower half of midline and margin, upper margin ciliolate, minutely scabrous towards apex.

Mainly Darling Downs district, on shallow sandy or stony soils, but also recorded from the vicinity of Mundubbera in the Burnett district.

There are three forms grouped under the variety depending on the size of the spikelet, and indumentum of the lemmas, but these forms have not been given distinguishing names and they intergrade with each other.

2. *Triodia mitchellii* Benth.

BUCK SPINIFEX

Triodia hostilis Domin; *T. pungens* auct. non R. Br., Lindl.

Perennial forming dense tussocks up to 1.5 m tall; culms glabrous. Leaf sheaths usually resinous, persistent along culm, flattened and markedly overlapping, orifice with shining hairs; ligules up to 0.5 mm long; leaf blades linear, folded or inrolled, attenuate, usually sharpe, up to 30 cm \times 0.3 cm, scabrous on margin. Panicles open, usually narrow, 10–20 cm long, branches slender; spikelets 0.8–1.4 cm long, florets 4–9; glumes dark purple except when old, narrowly ovate, blunt, \pm equal, 5–8 mm long, \pm 3-nerved, sometimes additional nerves between them, minutely scabrous on nerves and towards apex; lemmas

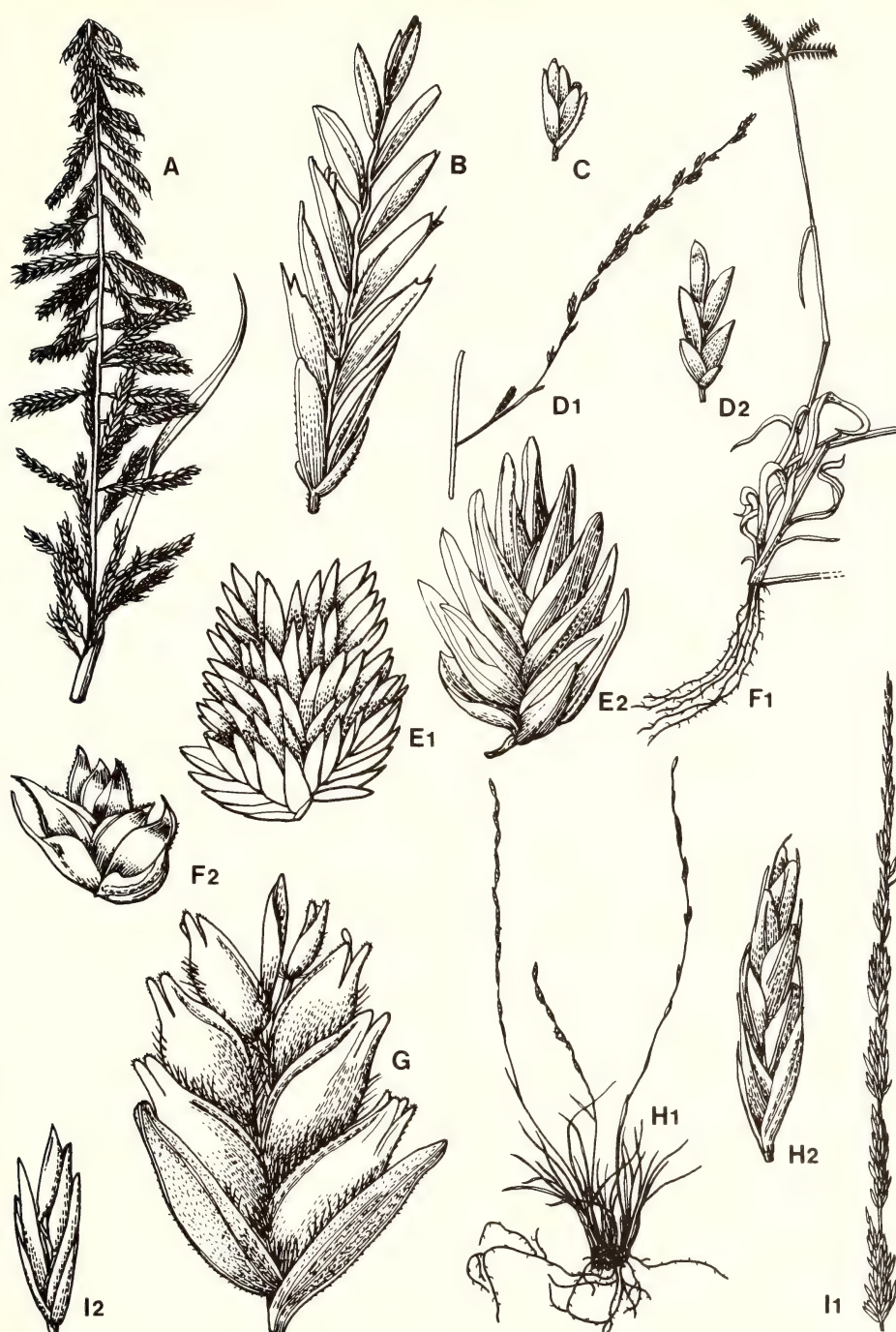


Fig. 27 POACEAE — **A** *Dinebra retroflexa*, inflorescence x 1; **B** *Diplachne fusca*, spikelet x 6; **C–D** *Leptochloa* spp. — **C** *L. filiformis*, spikelet showing long glumes x 6; **D₁–D₂** *L. ciliolata*, **D₁** raceme without basal spikelets x 1, **D₂** spikelet showing short glumes x 6; **E₁–E₂** *Eleusine tristachya*, **E₁** part spike of inflorescence showing overlapping spikelets x 3, **E₂** spikelet x 6; **F₁–F₂** *Dactyloctenium aegyptium*, **F₁** habit x 1/2, **F₂** spikelet x 6; **G** *Triodia marginata*, spikelet showing broad scarious lemma margin x 6; **H₁–H₂** *Tripogon loliiformis*, **H₁** habit x 1/2, **H₂** spikelet x 6; **I₁–I₂** *Thellungia advena*, **I₁** inflorescence x 1, **I₂** spikelet x 6.

purplish at least at tops, ovate, 4–8 mm long, some hairs present on lower half, deeply 3-lobed for $ca\ \frac{1}{3}$ their length, rather stiff and hardened, nerves distinct on lobes, rather obscure at base of lemma, margins of lateral lobes thin and scarious but border not extending to base of lemma and not ver conspicuous.

Mainly Darling Downs district but also recorded from Wide Bay and Burnett districts, on rocky or sandy soils.

3. *Triodia marginata* N. T. Burbidge

A SPINIFEX

Perennial forming dense tussocks up to $ca\ 1$ m tall; culms glabrous. Leaf sheaths usually resinous, persistent along culm, flattened and overlapping; orifice with shining hairs, ligule cilia up to $ca\ 0.5$ mm long; leaf blades linear, inrolled, attenuate, up to $30\text{ cm} \times 0.3\text{ cm}$, scabrous on margin, minutely so on inner surface. Panicles open, 12–20 cm long, branches slender; spikelets 1–1.6 cm long, florets 5–11; glumes purplish though paler than **T. mitchellii**, oblong-ovate, blunt, \pm equal, 4.5–6.5 mm long, $\pm\ 3$ pairs of main nerves, very stiffly scarious or hardened and indurate; lemmas pale except for tip, broadly ovate, 4.5–7 mm long, lower half with soft white hairs, 3-lobed for $ca\ \frac{1}{4}$ their length, lobes glabrous but margins minutely scabrous and ciliolate, 3 nerves obscure in lower part, lateral lobes with broad scarious edge curving in an arc to base of lemma. **Fig. 27G.**

Western Darling Downs district, on sandy soils.

63. SPOROBOLUS R. Br.

Perennials or annuals, tufted or creeping; culms usually erect. Ligules usually a rim of short hairs; leaf blades rolled in bud, flat or convolute. Inflorescences open or spike-like panicles, branches sometimes whorled; spikelets solitary, pedicellate, small, glabrous, rachilla disarticulating above glumes, floret 1 (sporadically 2 in **S. mitchellii**), bisexual; glumes usually unequal, narrow, acuminate, 1-nerved; lemmas as long as or longer than glumes, 1–3-nerved, awnless; palea equal to or shorter than lemma, 2-nerved, notched or minutely bilobed; stamens 2 or 3; ovary often globose; styles free, short, stigmas plumose. Mature caryopses with loose pericarps.

150 species tropical and warm temperate; 18 species Australia; 12 species south-eastern Queensland.

- | | |
|---|---------------------------|
| 1. Inflorescences with whorl of branches at lowest node | 2 |
| Inflorescences without whorl of branches at lowest node | 4 |
| 2. Inflorescences very open panicles with small delicate uniformly distributed spikelets terminating branchlets | 1. <i>S. caroli</i> |
| Inflorescences with spikelets clustered on branchlets | 3 |
| 3. Inflorescences axes distinctly scabrid, spikelets 1.1–1.4 mm long | 2. <i>S. scabridus</i> |
| Inflorescences axes smooth; spikelets 1.5–1.7 mm long | 3. <i>S. contiguus</i> |
| 4. Upper glumes at least $\frac{3}{4}$ length of spikelet, usually \pm as long as spikelet | 5 |
| Upper glumes $\frac{1}{4}$ – $\frac{3}{4}$ length of spikelet | 6 |
| 5. Stoloniferous grasses; leaf sheaths usually shorter than internodes; spikelets 1.7–2.5 mm long | 4. <i>S. mitchellii</i> |
| Rhizomatous grasses; leaf sheaths usually longer than internodes; spikelets 2.5–3 mm long | 5. <i>S. virginicus</i> |
| 6. Upper glumes less than half spikelet length | 7 |
| Upper glumes $\frac{1}{2}$ – $\frac{3}{4}$ spikelet length | 8 |
| 7. Culms up to 0.8 m tall; inflorescences spiciform, 10–35 cm long with 1 or 2 branches per node; upper glume blunt | 6. <i>S. jacquemontii</i> |
| Culms up to 1.5 m tall; inflorescences narrowly pyramidal, 20–45 cm long, with several branches per node; upper glume mucronate | 7. <i>S. pyramidalis</i> |
| 8. Spikelets spaced loosely and fairly evenly along inflorescence branches | 9 |
| Spikelets in dense spike-like clusters on inflorescences branches | 10 |

- | | |
|---|-------------------------|
| 9. Inflorescence branches bearing spikelets \pm to base; stamens 2 | 8. <i>S. diander</i> |
| Inflorescence branches without spikelets in lower $\frac{1}{3}$ – $\frac{1}{2}$; stamens 3 | 9. <i>S. laxus</i> |
| 10. Inflorescences densely spicate, rarely interrupted at base; stamens 3 | 10. <i>S. indicus</i> |
| Inflorescences interrupted in lower half, spikelets in dense clusters on
adpressed primary branches; stamens 2 | 11 |
| 11. Inflorescences with short stiff appressed branches, lowermost always
much shorter than internodes | 11. <i>S. creber</i> |
| Inflorescences with branches not stiffly appressed to rachis, lowermost
not much shorter than internodes | 12. <i>S. elongatus</i> |

1. *Sporobolus caroli* Mez**YAKKA GRASS; FAIRY GRASS**

Sporobolus lindleyi auct. non (Steudel) Benth., F. M. Bailey

Tufted perennial up to *ca* 80 cm tall; culms erect. Leaf sheaths usually pilose with tubercular-based hairs, and tubercular-ciliate on margin; ligules *ca* 0.5 mm long; leaf blades linear-ovate, attenuate, base \pm cordate, margin thickened, spinulose, undulate, up to 15 cm \times 0.5 cm, at least sparsely pilose, minutely scabrous. Panicles spreading, very open, 5–27 cm long, lowermost 5–10 branches in a whorl, capillary, spikelets terminating final branchlets; spikelets narrowly ovoid, 1.3–1.9 mm long, minutely scabrid; lower glume narrowly ovate, acute to acuminate, 0.5–0.9 mm long, upper glume narrowly ovate, acuminate, 1.3–1.9 mm long; lemma ovate-elliptic, 1.3–1.6 mm long; stamens 2. **Fig. 28A.**

Western Moreton, western Wide Bay, Burnett and Darling Downs districts, often in brigalow country.

2. *Sporobolus scabridus* S. T. Blake

Tufted perennial up to *ca* 60 cm tall; culms slender, erect or oblique, simple or sparsely branched. Leaf sheaths keeled, striate, scabrous; ligules densely ciliolate, up to 0.8 mm long; leaf blades rigid, linear, attenuated to blunt point, up to 13.5 cm \times 0.4 cm, glabrous or sparsely tubercular-pilose, scabrous, margin spinose-scabrous. Panicles narrow, spreading, 4–14 cm long, rachis scabrid, lowermost 8–10 branches arranged in a single whorl, then 2–4 per node upwards, branches rigid, capillary, short, lower $\frac{1}{5}$ – $\frac{1}{2}$ without spikelets; spikelets narrowly ovoid, 1.1–1.4 mm long, \pm appressed scabrid; lower glume narrowly ovate, blunt, 0.5–0.7 mm long, upper narrowly ovate, \pm obtuse, 1–1.4 mm long, 1-nerved; lemma narrowly oblong-ovate, obtuse, 1–1.3 mm long; stamens 3.

Western Darling Downs district, often in brigalow areas.

3. *Sporobolus contiguus* S. T. Blake

Tufted perennial up to *ca* 70 cm tall; culms slender, simple or sparsely branched. Leaf sheaths tubercular-pilose on margin; ligules *ca* 0.5 mm long; leaf blades linear, contorted flexuose, attenuate, up to *ca* 17 cm \times 0.4 cm, sometimes sparsely tubercular-pilose, minutely scabrous. Panicles effuse, up to 22 cm long, rachis \pm smooth, lowermost 10–12 branches arranged in a single whorl, otherwise in twos or threes \pm equally spaced along rachis; spikelets shortly pedicellate or subsessile, narrowly ovoid, 1.5–1.7 mm long; glumes narrowly ovate, lower acute, 0.5–0.7 mm long, upper acute or slightly obtuse, *ca* 1.5 mm long, 1-nerved; lemma narrowly oblong-ovate, *ca* 1.5 mm long, minutely scabrid; stamens 3. **Fig. 28B.**

Darling Downs district.

4. *Sporobolus mitchellii* (Trin.) C. E. Hubbard ex S. T. Blake**RAT'S TAIL COUCH**

Vilfa mitchellii Trin.; *Sporobolus benthamii* F. M. Bailey

Slender stoloniferous perennial up to *ca* 30 cm tall; culms erect or ascending. Leaf sheaths *ca* half as long as internode, margin papery, glabrous; ligules up to *ca* 0.5 mm long; leaf blades linear-triangular, usually flat, sometimes involute, attenuate, up to 9 cm \times 0.3 cm, minutely scabrous. Panicles narrow, 3–10 cm long, branches erect to ascending, spikelets \pm to base; spikelets narrowly ovoid, 1.7–2.5 mm long; lower glume ovate, \pm acute, 1–2 mm long, upper glume ovate, acute, 1.5–2.2 mm long, $\frac{3}{4}$ to as long as spikelet; florets occasionally 2; lemma ovate-elliptic, acute, 1.8–2.5 mm long; stamens ?2.

Darling Downs district, and further west.

5. *Sporobolus virginicus* (L.) Kunth

SAND COUCH; MARINE COUCH

Agrostis virginica L.; *Sporobolus virginicus* var. *minor* F. M. Bailey ex B. Simon

Rhizomatous perennial up to 40 cm tall; culms erect or ascending. Leaf sheaths usually longer than internodes, margin ciliate with tubercular-based hairs; ligules up to ca 0.5 mm long; leaf blades linear-triangular, flat or involute, attenuate, up to 25 cm \times 0.7 cm, glabrous or sprinkled with tubercular-based hairs, minutely scabrous. Panicles narrow, 2–10 cm long, branches erect to ascending, devoid of spikelets in ca lowest $\frac{1}{4}$ – $\frac{1}{5}$; spikelets narrowly ovoid, 2.5–3 mm long; lower glume ovate, blunt or acute, 2–3.5 mm long, upper glume ovate, acute, 2.5–3.5 mm long, as long as spikelet; lemma ovate-elliptic, acute, 2.5–3 mm long; stamens 3. **Fig. 28D.**

Moreton and Wide Bay districts, along the sea coasts in sand or bordering adjacent salt marshes or mangroves.

Two varieties, *S. virginicus* var. *virginicus* and *S. virginicus* var. *minor* F. M. Bailey ex B. Simon have been recognized but in recent studies it has been shown that the characters used to distinguish them are not reliable.

6. *Sporobolus jacquemontii* Kunth

Tufted perennial up to ca 80 cm tall; culms erect. Leaf sheaths striate; ligules up to ca 0.5 mm long; leaf blades linear, convolute, attenuate, up to 30 cm \times 0.3 cm, sometimes minutely scabrous. Panicles spiciform, 10–35 cm long, branches with spikelets \pm to base, ascending or \pm appressed to rachis; spikelets narrowly ovoid, 1.5–2 mm long; lower glume broadly oblong, obtuse, 0.3–0.5 mm long, upper glume ovate, obtuse to blunt, 0.5–0.9 mm long; lemma ovate-elliptic, acute, 1.5–2 mm long; stamens 3.

Recorded from the Wide Bay district.

7. *Sporobolus pyramidalis* Beauv.

Tufted perennial up to 1.5 m tall; culms stout. Leaf sheaths striate; ligules minute; leaf blades linear, flat or convolute when dry, attenuate, up to 50 cm \times 0.7 cm, minutely scabrous. Panicles narrowly pyramidal, 20–45 cm long, branches not whorled, but several from each node, densely spiculate along whole length except near base; spikelets very narrowly ovoid, 1.7–2 mm long; lower glume broadly oblong, obtuse or mucronate, 0.3–0.6 mm long, upper glume broadly oblong, obtuse, mucronate, 0.5–0.9 mm long; lemma ovate-elliptic, acute, 1.7–2 mm long, minutely scabrid; stamens 3. **Fig. 28C.**

Recorded from Wide Bay and Moreton districts.

8. *Sporobolus diander* (Retz.) Beauv.

TUSSOCKY SPOROBOLUS

Agrostis diander Retz. as "*diandra*"

Tufted perennial up to ca 1 m tall; culms erect. Leaf sheaths with ciliate margin; ligules up to 0.5 mm long; leaf blades linear, flat or involute, attenuate, up to 50 cm \times 0.4 cm, sometimes sparingly pilose, minutely scabrous. Panicles spiciform, 10–40 cm long, branches \pm appressed to rachis, bearing spikelets \pm to base; spikelets narrowly ovoid, 1.5–2.5 mm long, usually minutely scabrid; lower glume broadly oblong, truncate to obtuse, 0.3–0.7 mm long, upper glume ovate, acute to blunt, 0.7–1.5 mm long; lemma ovate-elliptic, acute, 1.5–2.3 mm long; stamens 2.

Recorded from the Moreton and Darling Downs district.

9. *Sporobolus laxis* B. Simon

Tufted perennial up to ca 1.5 m tall; culms slender or stout. Leaf sheaths with scabrous margin; ligules up to 0.5 mm long; leaf blades linear, involute when dry, attenuate, up to ca 50 cm \times 0.5 cm, minutely scabrous. Panicles narrow initially, 12–45 cm long, branches capillary, not whorled but few–several per node, without spikelets in lower $\frac{1}{3}$ – $\frac{1}{2}$; spikelets very narrowly ovoid, 1.5–2.3 mm long; lower glume broadly oblong, obtuse or emarginate, 0.5–0.8 mm long, upper glume broadly oblong to ovate, obtuse or acute, 0.7–1.2 mm long; lemma ovate-elliptic, acute, 1.5–2.2 mm long, smooth or minutely scabrid; stamens 3. **Fig. 28E.**

Moreton, Wide Bay and Burnett districts, often on fertile soil or in or near creek beds.



Fig. 28 POACEAE — *Sporobolus* spp. — A₁–A₂ *S. caroli*, A₁ open panicle x ½, A₂ spikelet x 24; B₁–B₂ *S. contiguus*, B₁ part inflorescence showing clusters of spikelets on branchlet x 1, B₂ spikelet x 24; C₁–C₂ *S. pyramidalis*, C₁ narrow inflorescence x ½, C₂ spikelet x 24; D *S. virginicus*, habit x ½; E *S. laxus*, inflorescence branch without spikelets in lower ⅓–½ x 1; F₁–F₂ *S. elongatus*, F₁ spiciform panicle x 1, F₂ spikelet x 24.

10. *Sporobolus indicus* (L.) R. Br. RAT'S TAIL GRASS; PARRAMATTA GRASS
Agrostis indica L.

Tufted perennial up to ca 80 cm tall; culms slender or stout. Leaf sheaths often \pm papery; ligules up to ca 0.5 mm long; leaf blades flat or convolute, attenuate, up to ca 50 cm \times 0.7 cm, minutely scabrid. Panicles linear with short side branches to spiciform, dense, 10–35 cm long, branches appressed to main axis, densely spiculate to base; spikelets narrowly ovoid, 1.5–2.5 mm long; lower glume broadly oblong to broadly ovate, obtuse, 0.5–1 mm long, upper glume ovate or ovate-elliptic, bluntly acuminate, 0.7–1.6 mm long; lemma ovate-elliptic, 1.5–2.5 mm long, \pm smooth; stamens 3.

Three varieties occur in the region:

- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| 1. Grain almost as long as lemma and palea | . | . | . | . | . | <i>S. indicus</i> var. <i>indicus</i> | |
| Grain somewhat shorter than lemma and palea | . | . | . | . | . | . | 2 |
| 2. Spikelets 1.5–2 mm long; grain 0.8–1 mm long | . | . | . | . | . | <i>S. indicus</i> var. <i>fertilis</i> | |
| Spikelets 2.1–2.5 mm long; grain 1.1–1.2 mm long | . | . | . | . | . | <i>S. indicus</i> var. <i>africanus</i> | |

S. indicus var. *indicus* has been recorded from the coastal districts while *S. indicus* var. *africanus* (Poirot) Jovet & Guedes (*Agrostis africana* Poirot; *S. africanus* (Poirot) Robyns & Tournay) have been recorded from the Moreton, Darling Downs and Wide Bay districts. *S. indicus* var. *fertilis* (Steudel) Jovet & Guedes (*Agrostis fertilis* Steudel; *S. fertilis* (Steudel) W. D. Clayton has been recorded from the Wide Bay district.

11. *Sporobolus creber* J. De Nardi

Slender tufted perennial up to ca 1 m tall; culms erect. Leaf sheaths striate; ligules up to 0.5 mm long; leaf blades linear, usually involute, attenuate, up to 50 cm \times 0.4 cm, minutely scabrous. Panicles spiciform, interrupted, 10–50 cm long, branches densely spiculate to base, at least lower branches shorter than internodes; spikelets narrowly ovoid, 1.5–2 mm long; lower glume oblong, obtuse, 0.4–0.7 mm long, upper glume ovate-oblong, blunt, 0.7–1 mm long; lemma ovate-elliptic, acute, 1.5–2 mm long; stamens 2.

Recorded from all districts of the region, often on sandy loam soils.

12. *Sporobolus elongatus* R. Br.

SLENDER RAT'S TAIL GRASS

Sporobolus indicus (L.) R. Br. var. *elongatus* (R. Br.) F. M. Bailey

Tufted perennial up to ca 1 m tall; culms usually slender, smooth. Leaf sheaths striate; ligules up to 0.5 mm long; leaf blades linear, flat or convolute, flexuose, attenuate, up to 50 cm \times 0.4 cm, smooth or minutely striate. Panicles spiciform, 10–40 cm long, branches appressed to rachis, densely spiculate to base; spikelets narrowly ovoid, 1.5–2 mm long; lower glume oblong, obtuse, 0.5–1 mm long, upper glume ovate, obtuse, 0.7–1.2 mm long; lemma ovate-elliptic, 1.3–2 mm long, \pm smooth; stamens 2. **Fig. 28F.**

Recorded from all districts of the region, on a variety of soils.

64. LEPTURUS R. Br.

Stoloniferous or caespitose perennials. Ligules reduced to ciliate rims; leaf blades narrow. Inflorescences solitary fragile cylindrical spikes disarticulating transversely or obliquely at nodes when mature, spikelets alternate, edgewise on, and embedded in hollows on opposite sides of cylindrical rachis; spikelets with 1, rarely 2 florets, florets bisexual; lower glume adaxial, usually suppressed except in terminal spikelet, upper glume cartilaginous, thick and indurated, truncate, acute or tapering into straight awn, 5–12-nerved; lemma boat-shaped, membranous to scarious, 3-nerved, awnless; palea ca as long as lemma, hyaline; stamens 3; stigmas 2. Caryopses obloid-ellipsoid, dorsally flattened, with free pericarps.

15 species, sea coasts of tropical eastern Africa, Madagascar to Australia and Polynesia; 4 species Australia; 1 species south-eastern Queensland.

1. *Lepturus repens* (G. Forster) R. Br.

Rottboellia repens G. Forster; *Monerma repens* (G. Forster) Beauv.

Perennial with branched creeping stolons, rooting at nodes and there forming tufts of

shoots and culms; culms erect or spreading, 10–60 cm tall. Ligules very short and irregular; leaf blades linear to very narrowly ovate, long attenuate, 3–30 cm \times 0.4–1 cm, minutely scabrous on margin and upper surface. Spikes 4–20 cm long; spikelets 0.6–1.7 cm long, rarely terminal longer; upper glume very narrowly ovate, finely acute or long acuminate, 0.4–1.7 mm long, body *ca* 4–5 mm long, minutely scabrous; lemma ovate-oblong, obtuse, 3.5–5 mm long, minutely pubescent at base and sometimes near margin. **Fig. 29A.**

Sea coasts, growing on sand or occasionally on rocky headlands.

65. PEROTIS Aiton

Annuals or sometimes perennials. Ligules a short membranous rim; leaf blades flat, broadest at base and subamplexicaule. Inflorescences of slender spikes, spikelets sessile on main axis; spikelets solitary, falling entire, floret 1, bisexual; glumes subequal, narrow, 1-nerved, each tipped by long slender awn; lemma hyaline, narrowly ovate, acute, much shorter than glumes, 1-nerved; stamens 3; ovary glabrous, styles short, basally united, stigmas plumose. Caryopses linear-ovoid, exserted from unchanged lemma and palea, and enclosed with them in the glumes.

10 species, tropical Africa, southern India, Sri Lanka, eastern Asia, Australia; 2 species Australia; 1 species south-eastern Queensland.

1. *Perotis rara* R. Br.

COMET GRASS

Slender annual up to 40 cm tall; culms branched at base, geniculately ascending to erect. Ligule cilia up to 0.5 mm long; leaf blades linear-ovate, attenuate, 1.5–5 cm \times 0.2–0.3 cm, coarsely ciliate along margin and around orifice. Spikes feathery in appearance, 10–27 cm long; spikelets up to 5 cm long; body of glumes linear-ovate, minutely scabrous, lower embracing upper, 4–6 mm long, upper slightly shorter than lower, both tipped by capillary awns 0.6–5 cm long; lemma membranous, narrowly ovate, blunt, shining, 2–4 mm long. **Fig. 29B.**

Scattered through much of the region, on sandy or stony soils.

66. ZOYSIA Willd.

Low perennials with creeping rhizomes or stolons. Ligules a line of hairs or a membranous rim; leaf blades short, narrow. Inflorescences of cylindrical terminal spike-like racemes, spikelets closely appressed to axis; spikelets solitary, sessile or shortly pedicellate, laterally compressed, falling entire at maturity, floret 1, bisexual, completely enclosed by upper glume; lower glume absent, upper glume coriaceous, as long as spikelet; lemma membranous or hyaline, awnless, 1-nerved; palea shorter than lemma; stamens 2 or 3; styles distinct, stigmas 2. Caryopses enclosed in hardened upper glume.

10 species, Mauritius, Mascarenes to Australia and New Zealand and the Solomon Is; 2 species Australia; 1 species south-eastern Queensland.

1. *Zoysia macrantha* Desvaux

PRICKLY COUCH

Zoysia pungens auct. non Willd., R. Br. et al.

Perennial with long rhizomes and stolons; culms slender, rigid, erect or ascending, 5–30 cm long. Leaf sheaths loose; ligules a minutely ciliate rim; leaf blades linear, attenuate into blunt apex, 2–16 cm \times 0.2–0.4 cm, \pm glabrous, smooth except for a few long hairs at orifice. Racemes erect, rather dense; spikelets shining, 3.5–6 mm long, pedicels up to 1 mm long; lower glume absent, upper glume ovate in outline, 3.5–4 mm long, minutely bilobed, mucronate or tipped by slender awn up to 4 mm long, nerves obscure; lemma ovate-oblong or narrowly oblong, minutely bilobed, 2.5–3.5 mm long. **Fig. 29C.**

Sea coasts of the region, growing on sand dunes or sandy areas.

67. **TRAGUS** Haller

Annuals or perennials; culms erect, ascending or decumbent. Ligules reduced to a delicate ciliate rim; leaf blades flat, spinulosely ciliate on margin. Inflorescences of stiff dense cylindrical spike-like panicles, spikelets in subsessile deciduous clusters, each cluster composed of 2-5 spikelets, these paired or sessile on very short rachis; spikelet with 1 floret, bisexual; glumes dissimilar, lower minute and hyaline or suppressed, upper as long as spikelet, 5 nerves formed into prominent ribs, each bearing a row of stout prickles, membranous between ribs; lemma almost as long as glume, membranous, 3-nerved; palea as long as lemma, 2-nerved; stamens 3; styles distinct, stigmas plumose. Caryopses obloid to ellipsoid, slightly dorsally compressed, enclosed by lemma and palea.

6 species warm Africa, 1 pantropical; 2 species Australia; 1 species south-eastern Queensland.

1. ***Tragus australianus*** S. T. Blake

SMALL BURRGRASS; TICKGRASS

Tragus racemosus auct. non (L.) All.

Tufted annual up to 60 cm tall; culms erect or oblique or geniculately ascending. Leaf sheaths close around culms, striate; ligules minute, ciliate; leaf blades very narrowly ovate, acute to acuminate, basally subcordate, (1-)2.5-6 cm × 0.2-0.5 cm, ± undulate, margin thickened and spinosely ciliate. Inflorescences 5-7.5 cm long, branches *ca* 1 mm long; spikelets 2 per branch, slightly unequal, 3.4-5 mm long; upper glume narrowly ovate, acute to acuminate, 3.5-4 mm long, 5-7-nerved, densely spiny on nerves with thick uncinat spines; lemma oblong, acute, mucronate, 2.5-3 mm long. **Fig. 29D.**

Scattered throughout the region, an early colonizer of bare patches or disturbed sites, or in sandy areas.

68. **ENNEAPOGON** Desvaux

Slender tufted perennials or annuals. Ligules a rim of hairs; leaf blades narrow, convolute or sometimes flat. Inflorescences narrow spike-like panicles, bristly plumose from numerous awns, sometimes with cleistogamous spikelets in lower leaf sheaths; spikelets solitary, pedicellate, rachilla disarticulating above glumes, florets 3-6, lower 1-3 bisexual, upper sterile or rudimentary, sometimes reduced to awns; glumes membranous, oblong or ovate, acute to obtuse, usually 7-9-nerved; fertile lemmas up to as long as glumes, rounded on back, stiff, smooth or ribbed, ± pubescent, 9-nerved with nerves continuing into 9 plumose equal awns spreading at maturity; paleas longer than lemmas, ovate or oblong, 2-keeled, keels ciliate near margin; stamens 3; ovary glabrous, styles short, distinct, stigmas plumose. Caryopses oblong to obovate in outline, ± dorsally compressed.

30 species, warm regions; 20 species Australia; 8 species south-eastern Queensland.

- | | |
|---|--------------------------|
| 1. Lower glumes 1.5-2.5 mm long | 2 |
| Lower glumes 3.5-7 mm long | 3 |
| 2. Hairs on back of lowest lemma long and developed from base or lower third | 1. <i>E. lindleyanus</i> |
| Hairs on back of lowest lemma rather short and dense, developing irregularly on lower two-thirds | 2. <i>E. pallidus</i> |
| 3. Lowest lemma thickened along nerves at maturity, appearing ribbed | 4 |
| Lowest lemma ± smooth, at maturity not appearing ribbed | 5 |
| 4. Glumes with membranous margin <i>ca</i> 0.5 mm wide, lower 3.5-4 mm long, upper 4-5 mm long; lowest lemma very deeply ribbed | 3. <i>E. flavescens</i> |
| Glumes with membranous margin <i>ca</i> 0.2-0.3 mm wide, lower 4-5 mm long, upper 5-6 mm long; lowest lemma ribbed but not deeply | 4. <i>E. nigricans</i> |
| 5. Awns arising lower on sides than from middle of lemma apex; lemmas 2-3 mm long | 5. <i>E. polyphyllus</i> |
| Awns arising from same level of lemma apex; lemmas 1.5-2 mm long | 6 |

- | | | |
|---|--------------------------|---|
| 6. Annuals or rarely perennials with glumes 13- or more-nerved; membranous margin on glumes <i>ca</i> 0.5 mm wide | 6. <i>E. avenaceus</i> | |
| Distinct perennials with glumes 5-13-nerved; membranous margin on glumes narrow, <i>ca</i> 0.2-0.3 mm wide | | 7 |
| 7. Plants pubescent at base with long simple hairs; leaves spreading, not mostly basal | 7. <i>E. intermedius</i> | |
| Plants glabrous or very shortly pubescent at base; leaves mostly basal | 8. <i>E. gracilis</i> | |

1. *Enneapogon lindleyanus* (Domin) C. E. Hubbard

Pappophorum lindleyanum Domin; *P. lindleyanum* var. *convolutum* Domin

Tufted and spreading perennial up to 50 cm tall; culms erect or geniculately ascending, often much-branched from upper nodes, nodes bearded. Leaves pubescent with minute glandular hairs or almost glabrous; ligule cilia *ca* 0.5 mm long; leaf blades linear, involute, attenuate, 3-15 cm \times 0.1-0.3 cm long. Panicles very compact, (0.5-)1-2(-3) cm long, exerted on long peduncle; glumes oblong-elliptic, obtuse, mucronate or ragged, membranous margin *ca* 0.2 mm wide, 3-5-nerved, glabrous or sparsely pubescent with simple and glandular hairs, lower 1.5-2.5 mm long, upper 2-3 mm long; fertile lemma *ca* 1.5-2 mm long, somewhat ribbed by thickened nerves, with a long tuft of hairs at base, awns stiffly spreading, 1.5-2 mm long, stiffly plumose-ciliate for at least $\frac{2}{3}$ length, or almost to tip. **Fig. 29E.**

Scattered in the region on open rocky soils.

2. *Enneapogon pallidus* (R. Br.) Beauv.

CONETOP NINEAWN

Pappophorum pallidum R. Br.; *P. nigricans* var. *pallidum* (R. Br.) Domin

Tufted perennial up to *ca* 60 cm tall, pubescent at base; culms erect or ascending, rigid, slender, nodes bearded. Leaves minutely glandular pubescent or \pm glabrous; ligule cilia *ca* 0.5 mm long; leaf blades linear, involute or flat, attenuate, 4-15 cm \times 0.2-0.3 cm. Panicles variable, compact or loose, (1-)3-8 cm long; glumes narrowly ovate to oblong, obtuse, 5-7-nerved, pubescent with simple and glandular hairs or glabrous, minutely scabrous, lower 1.5-2 mm long, upper 2-3 mm long; fertile lemma oblong, 1.5-2 mm long, ribbed by nerves and shortly pubescent in lower $\frac{1}{2}$ - $\frac{2}{3}$, awns (1-)2-4 mm long, stiffly plumose-ciliate for lower $\frac{2}{3}$ length.

Two varieties occur in the region:

- | | |
|---|--|
| 1. Inflorescences 3-8 cm long; awns 2-4 mm long | <i>E. pallidus</i> var. <i>pallidus</i> |
| Inflorescences 1-2 cm long; awns 1-1.5 mm long | <i>E. pallidus</i> var. <i>brevisetula</i> |

E. pallidus var. *pallidus* has been recorded from the Moreton, Darling Downs and Burnett districts while *E. pallidus* var. *brevisetula* N. T. Burbidge has been recorded from Moreton and Burnett districts.

3. *Enneapogon flavescens* (Lindl.) N. T. Burbidge

Pappophorum flavescens Lindl.

Tufted perennial up to 60 cm tall, often pubescent at base; culms erect, rigid, bearded at nodes. Ligule cilia 0.5-1 mm long; leaf blades linear, mostly involute, attenuate, 7-23 cm \times 0.1-0.3 cm, glabrous or sometimes sparsely pubescent or minutely hispid. Panicles compact or loose and branched, 3-10 cm long; glumes narrowly ovate, acute, membranous margin *ca* 0.5 mm wide, 5-9-nerved, minutely scabrid, lower 3.5-4 mm long, upper 4-5 mm long; fertile lemma broad, 1.5-2 mm long, deeply ribbed by prominent nerves, with a tuft of long silky hairs on back at base, awns 5-6 mm long, plumose-ciliate for at least lower $\frac{2}{3}$ length.

Darling Downs and Burnett districts, often on heavy or black soils.

4. *Enneapogon nigricans* (R. Br.) Beauv.

NIGGERHEADS

Pappophorum nigricans R. Br.; *P. nigricans* var. *brownianum* Domin; *P. commune* F. Muell.

Tufted perennial up to *ca* 50 cm tall; culms erect, rigid, glabrous or minutely glandular pubescent, nodes bearded. Ligule cilia *ca* 0.5 mm long, leaf blades linear, involute, attenuate, 3-18 cm \times 0.1-0.3 cm, pubescent with simple hairs on upper surface. Panicles

compact, entire or interrupted, (2-)3-8.5 cm long; glumes narrowly ovate, acuminate or acute, membranous margin narrow, lower 4-5 mm long, upper 5-6 mm long; fertile lemma shortly oblong, *ca* 2 mm long, somewhat ribbed by nerves, clothed in lower $\frac{1}{2}$ by long silky hairs, awns 4-6 mm long, plumose-ciliate for lower $\frac{2}{3}$ length. **Fig. 29F.**

Darling Downs district.

5. *Enneapogon polyphyllus* (Domin) N. T. Burbidge

LEAFY NINEAWN

Pappophorum nigricans var. *polyphyllum* Domin; *P. nigricans* var. *pallidum* Domin; *P. avenaceum* var. *nanum* Domin; ?*P. nigricans* var. *polyphyllum* forma *plurinerve* Domin

Loosely tufted annual or short-lived perennial up to 60 cm tall; culms erect, spreading, much-branched from upper nodes, nodes bearded. Leaves pubescent with simple and glandular hairs; ligule cilia *ca* 0.5 mm long; leaf blades linear, involute, attenuate, 3-15 cm \times 0.15-0.4 cm. Panicles loose, 2.5-10 cm long; glumes narrowly ovate, acuminate or acute, membranous margin narrow, 5-11-nerved, pubescent, lower 4-6 mm long, upper 5-7 mm long; fertile lemma 2-3 mm long, \pm smooth, clothed with long hairs on lower $\frac{1}{2}$, awns 6-7 mm long, plumose for lower $\frac{2}{3}$ length. **Fig. 29G.**

Drier parts of the region.

6. *Enneapogon avenaceus* (Lindl.) C. E. Hubbard

BOTTLE WASHERS

Pappophorum avenaceum Lindl.; *P. avenaceum* var. *typicum* Domin; *P. avenaceum* var. *depauperatum* Domin; *P. commune* var. *avenaceum* (Lindl.) Maiden & Betche

Loosely tufted annual or rarely perennial up to 50 cm tall; culms erect or spreading, villous at base, nodes bearded. Leaves pubescent with simple and glandular hairs; ligule cilia 0.5-1 mm long; leaf blades linear, commonly involute, attenuate, 5-20 cm \times 0.2-0.5 cm, minutely scabrous. panicles loose, 3.5-12 cm long; glumes ovate, acute, membranous margin *ca* 0.5 mm wide, 13-21-nerved, pubescent with both simple and glandular hairs, lower 5-7 mm long, upper 7-9 mm long; fertile lemmas 2 or 3 per spikelet, short and broad, 1.5-2 mm long with a tuft of silky hairs at least as long as lemma on back at base, otherwise smooth, awns 0.6-1.2 cm long, softly plumose for lower $\frac{2}{3}$ length.

Darling Downs district, preferring open ground or colonizing bare areas.

7. *Enneapogon intermedius* N. T. Burbidge

Pappophorum nigricans var. *glabrescens* Domin

Tufted perennial up to *ca* 60 cm tall, pubescent with long simple hairs at base; culms erect, simple, rigid, nodes bearded. Leaves pubescent with glandular hairs; ligule cilia 0.5 mm long; leaf blades linear, involute, attenuate, 3-18 cm \times 0.2-0.4 cm, often minutely hispid. Panicles compact, 2.5-10 cm long; glumes narrowly ovate, acuminate to obtuse, 9-11-nerved, pubescent with simple and glandular hairs, lower 3.5-5 mm long, upper 4-6 mm long; fertile lemma short and broad, *ca* 1.5 mm long, smooth, with a long tuft of hairs at base, or shortly pubescent, awns 4-6 mm long, plumose-ciliate for lower $\frac{2}{3}$ length.

Scattered throughout the region, in eucalypt open forest.

8. *Enneapogon gracilis* (R. Br.) Beauv.

SLENDER NINEAWN

Pappophorum gracile R. Br.; *P. nigricans* var. *gracile* (R. Br.) Domin; *P. virens* Lindl.

Slender tufted perennial up to *ca* 60 cm tall, glabrous, or very shortly pubescent at base, nodes shortly pubescent. Ligule cilia 0.5-1 mm long; leaf blades linear, involute, attenuate, 3-20 cm \times 0.1-0.3 cm, glabrous or minutely glandular pubescent. Panicles loose or rather compact, 2-13 cm long; glumes ovate, acuminate or acute, membranous margin *ca* 0.3 mm broad, 7-13-nerved, minutely glandular pubescent, lower 3.5-5 mm long, upper 5-7 mm long; fertile lemma short and broad, 1.5-2 mm long, smooth, shortly pubescent over at least lower $\frac{1}{2}$, awns 5-7 mm long, plumose-ciliate for lower $\frac{2}{3}$ length. **Fig. 29H.**

Darling Downs and Burnett districts, in eucalypt open forest and black soil grassland.

69. ARUNDINELLA Raddi

Annuals or perennials; culms simple or branching. Ligules truncate; leaf blades usually flat. Inflorescences open or contracted panicles; spikelets mostly paired, unequally pedicelled, florets 2, lower male or sterile or rarely bisexual, upper bisexual and smaller than lower; glumes persistent, unequal, lower shorter than spikelet, upper as long as spikelet; lower floret subpersistent, lemma ± equal to lower glume, 3–7-nerved, palea 2-keeled; upper floret with lemma 1–7-nerved, awned from the tip or sinus (in Australian species), palea 2-keeled; stamens 3; styles distinct. Caryopses tightly enclosed in lemma and palea.

About 55 species, mostly tropical and subtropical Asia and America, but also Africa and Australia; 4 species Australia; 3 species south-eastern Queensland.

- | | |
|--|---------------------------|
| 1. Leaf blades mostly flat; rhizomes scaly; widespread | 1. <i>A. nepalensis</i> |
| Leaf blades involute; rhizomes not scaly; restricted to rock crevices on mountains | 2 |
| 2. Plants less than 25 cm tall; basal leaves filiform | 2. <i>A. grevillensis</i> |
| Plants mostly 30–70 cm tall; basal leaves linear | 3. <i>A. montanus</i> |

1. *Arundinella nepalensis* Trin. REED GRASS

Perennial up to ca 2 m tall, arising from scaly rhizomes; culms rigid, simple or branched, nodes up to ca 5. Leaf sheaths strongly nerved, glabrous; ligules short, densely ciliate; leaf blades flat, up to 40 cm long. Inflorescences open panicles up to 40 cm long, pedicels 2–6 mm long; spikelets 5–7 mm long, excluding awns; lower glume ca 4.5 mm long, 5-nerved, not scabrid; lower floret usually male, lemma similar to upper glume, palea membranous, ca 4 mm long; upper floret with membranous lemma ca 2.5 mm long, ± bilobed, with geniculate awn ca 4–5 mm long, palea ca 2.5 mm long.

Widespread in the region, often on damp soils near streams or in gullies. It is of little fodder value.

2. *Arundinella grevillensis* B. Simon

Densely tufted perennial up to 25 cm tall, arising from slender rhizomes which are woolly hairy at origin of culms; culms branched at base, nodes up to 9. Leaf sheaths strongly nerved, with few tubercular-based hairs; ligules membranous, with hairs up to 1 mm long; leaf blades mostly involute, filiform, up to 7 cm long, with sparse tubercular-based hairs. Inflorescences panicles up to 8 cm long, pedicels 2–4 mm long; spikelets 5 mm long excluding awns; lower glume 4 mm long, 5–7-nerved, central nerve slightly scabrid towards apex, upper glume acuminate, 5 mm long, 5-nerved; lower floret male, lemma similar to upper glume, palea membranous, 3.5 mm long; upper floret with lemma coriaceous, scabrid, ca 2.5 mm long, truncate at top, with geniculate awn 4.5 mm long, palea 3 mm long. **Fig. 291.**

Known only from rocky slopes of Mt Greville in the Moreton district.

3. *Arundinella montana* S. T. Blake MOUNTAIN REED GRASS

Tufted perennial mostly 30–70 cm tall, rarely up to 90 cm tall, arising from short rhizomes; culms simple or sparingly branched, nodes up to 9. Leaf sheaths strongly nerved, glabrous or sparsely pilose with tubercular-based hairs; ligules membranous, with hairs ca 0.4 mm long; leaf blades ± linear, mostly involute, up to 19 cm long. Inflorescences panicles mostly 8–23 cm long, pedicels up to ca 3 mm long; spikelets numerous, 4–5 mm long excluding awns; lower glume 3–4.5 mm long, 3–7-nerved, central nerve slightly scabrous towards apex, upper glume 4–5 mm long, 5–7-nerved; lower floret male, lemma similar to upper glume, palea membranous, 3–3.5 mm long; upper floret with lemma coriaceous, scabrid, 2.5–3 mm long, bilobed or truncate, with geniculate awn 4–6 mm long, palea 2.5–3 mm long.

Known only from mountains of the eastern and southern Moreton district, usually in rock crevices in exposed situations.

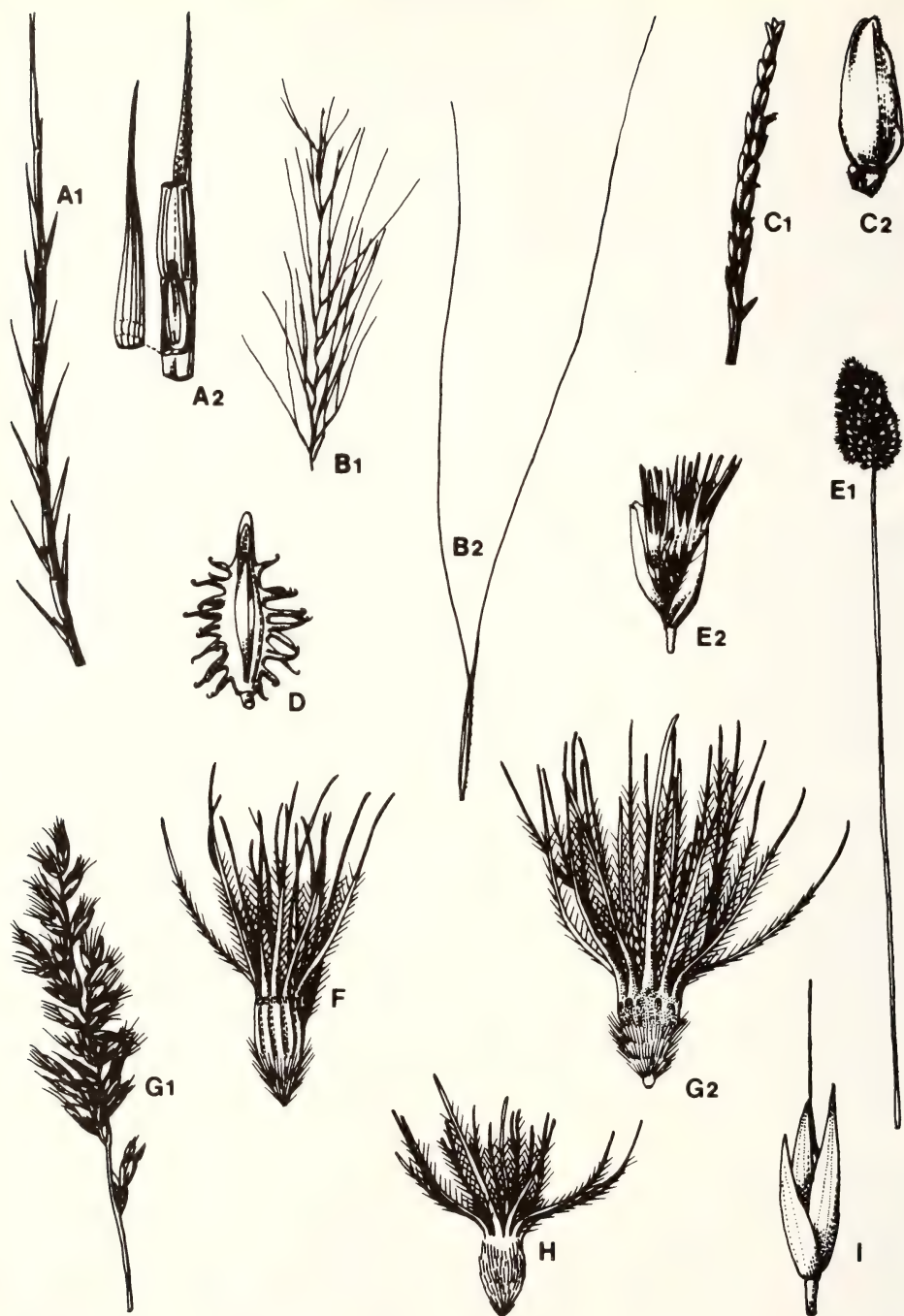


Fig. 29 POACEAE — A₁–A₂ *Lepturus repens*, A₁ inflorescence x 1, A₂ spikelet on rachis with glume removed x 3; B₁–B₂ *Perotis rara*, B₁ part inflorescence x 1, B₂ spikelet x 3; C₁–C₂ *Zoysia macrantha*, C₁ inflorescence x 1, C₂ spikelet x 6; D *Tragus australianus*, spikelet showing spiny glumes x 6; E–H *Enneapogon* spp. — E₁–E₂ *E. lindleyanus*, E₁ inflorescence x 1, E₂ spikelet showing hairs developed from base of lower lemma x 6; F *E. nigricans*, spikelet showing ribbed lemma x 6; G₁–G₂ *E. polyphyllus*, G₁ inflorescence x 1, G₂ spikelet showing awns arising lower on sides than at middle x 6; H *E. gracilis*, spikelet showing awns arising from same level across lemma apex x 6; I *Arundinella grevilleensis*, spikelet x 6.

70. PANICUM L.

Annuals or perennials. Ligules membranous; leaf blades flat or involute. Inflorescences open or racemose panicles; spikelets solitary or rarely in pairs, florets 2, lower male or sterile, upper bisexual; glumes unequal, lower shorter than spikelet, 0–7-nerved, upper as long as spikelet, 5–9-nerved; lower floret with lemma similar to upper glume, 3–11-nerved, palea membranous or translucent, rarely absent; upper floret with lemma stiff or hardened, plano-convex, margin inrolled, nerves not obvious, palea stiff or hardened, as long as lemma, enclosed by margins of lemma; stamens 3; styles distinct. Caryopses tightly enclosed in lemma and palea.

Over 300 species, chiefly tropical and subtropical regions of the world; *ca* 38 species, 9 naturalized, Australia; 19 species south-eastern Queensland.

1. Paleas of lower florets absent Paleas of lower florets present	2 7
2. Lower glumes $\frac{2}{3}$ – $\frac{7}{8}$ length of spikelets Lower glumes <i>ca</i> $\frac{1}{4}$ or <i>ca</i> $\frac{1}{2}$ length of spikelets	3 4
3. Lower glumes acute to acuminate at tip Lower glumes rounded at tip	1. <i>P. queenslandicum</i> 2. <i>P. prolatum</i>
4. Lower glumes <i>ca</i> $\frac{1}{2}$ length of spikelets Lower glumes <i>ca</i> $\frac{1}{4}$ length of spikelets	3. <i>P. bisulcatum</i> 5
5. Plants growing in water or swampy areas; upper glumes 9-nerved Plants growing in shady places, often in rainforest; upper glumes 5-nerved	4. <i>P. obseptum</i> 6
6. Leaf sheaths with conspicuous long spreading tubercular-based hairs; nodes glabrous or with few hairs Leaf sheaths with inconspicuous short tubercular-based hairs; nodes pubescent	5. <i>P. pygmaeum</i> 6. <i>P. lachnophyllum</i>
7. Lower glumes $\frac{3}{4}$ – $\frac{7}{8}$ length of spikelets Lower glumes less than $\frac{3}{4}$ length of spikelets	1. <i>P. queenslandicum</i> 8
8. Lower glumes $\frac{1}{2}$ – $\frac{3}{4}$ length of spikelets Lower glumes less than $\frac{1}{2}$ length of spikelets	9 12
9. Spikelets 4–6 mm long Spikelets 2–3 mm long	7. <i>P. miliaceum</i> 10
10. Leaves and leaf sheaths glabrous or scabrous Leaves and leaf sheaths with at least a few soft tubercular-based hairs	8. <i>P. subxerophilum</i> 11
11. Upper glumes and lemmas of lower florets 5–7-nerved Upper glumes and lemmas of lower florets 9-nerved	9. <i>P. effusum</i> 10. <i>P. novemnerve</i>
12. Lower florets male; palea of lower floret \pm equal in length to lemma Lower florets sterile; palea of lower floret up to $\frac{7}{8}$ length of lemma	13 16
13. Fertile florets rugulose Fertile florets smooth and shiny	11. <i>P. maximum</i> 14
14. Ligules less than 1 mm long; lower glume $\frac{1}{5}$ – $\frac{1}{3}$ as long as spikelet Ligules 1 mm or more long; lower glume either $\frac{1}{3}$ – $\frac{1}{2}$ or $\frac{1}{8}$ – $\frac{1}{4}$ as long as spikelet	12. <i>P. repens</i> 15
15. Lower glume $\frac{1}{8}$ – $\frac{1}{4}$ as long as spikelet; tufted non-rhizomatous annual Lower glume $\frac{1}{3}$ – $\frac{1}{2}$ as long as spikelet; spreading rhizomatous perennial	13. <i>P. gilvum</i> 14. <i>P. antidotale</i>
16. Paleas of lower florets less than $\frac{1}{2}$ length of lemmas Paleas of lower florets more than $\frac{1}{2}$ length of lemmas	15. <i>P. larcomianum</i> 17

- | | | |
|--|--------------------------------------|----|
| 17. Upper florets $\frac{1}{2}$ length of spikelets | 16. <i>P. buncei</i> | 18 |
| Upper florets more than $\frac{1}{2}$ length of spikelet | | |
| 18. Ligules <i>ca</i> 3 mm long; aquatic plants with floating culms or rooting at nodes in mud | 17. <i>P. paludosum</i> | 19 |
| Ligules 1–2 mm long; non-aquatic plants | | |
| 19. Lower primary branches of panicles often verticillate, distinctly flattened and broad towards base; coarse perennial | 18. <i>P. decompositum</i> | |
| Lower primary branches almost always solitary, those above 1–few together, rarely verticillate; slender annual | 19. <i>P. laevinode</i> | |

1. *Panicum queenslandicum* Domin**YABILA GRASS**

Panicum shirleyanum Domin; *P. benthamii* auct. non (Benth.) Steudel, Domin

Perennial, tufted, spreading, 50–100 cm tall; culms \pm rigid, simple or sometimes branched, nodes glabrous. Leaf sheaths usually smooth and glabrous; ligules reduced to row of cilia *ca* 1 mm long; leaf blades narrow, apex attenuate, margin mostly convolute or sometimes flat, 10–30 cm \times 0.2–0.3 cm, usually with at least a few long hairs when young. Panicles widely spreading, up to 40 cm long, lower branches produced in a whorl of 4 with prominent thickenings at their base, up to 23 cm long, pedicels 0.5–10 mm long; spikelets 3–5 mm long; lower glume $\frac{3}{4}$ – $\frac{7}{8}$ as long as spikelet, 5-nerved, \pm scabrous on mid-nerve tip, upper glume *ca* as long as spikelet, 7-nerved; lower floret sterile, lemma *ca* as long as upper glume, 7-nerved, palea *ca* $\frac{1}{3}$ length of lemma or absent; upper floret bisexual, lemma crustaceous, smooth and shining, margins embracing palea, *ca* 2.5 mm long, palea crustaceous, slightly shorter than lemma. **Fig. 30A.**

Widespread in the Moreton, Darling Downs and Burnett districts, usually on heavy soils.

2. *Panicum prolatum* F. Muell.**RIGID PANIC**

Homopholis proluta (F. Muell.) R. Webster

Perennial, tufted, 20–70 cm tall; culms rigid, sometimes branching from lower nodes, nodes glabrous. Leaf sheaths \pm smooth to \pm scabrous; ligules membranous, sometimes lacerated, 2–4 mm long; leaf blades linear, narrowed from about middle to acuminate or acute tip, margin usually flat or occasionally loosely inrolled, 2–15 cm \times 0.2–0.7 cm, often slightly scabrid. Panicles much divided, up to 25 cm long, primary branches up to 20 cm long, pedicels 1.5–10 mm long; spikelets 2.5–4 mm long, lower glume $\frac{2}{3}$ – $\frac{7}{8}$ as long as spikelet, 5-nerved, upper glume *ca* as long as spikelet, mostly 7-nerved; lower floret sterile, lemma *ca* as long as spikelet, 7-nerved, palea absent; upper floret bisexual, smooth and shining, lemma crustaceous, margins embracing palea, *ca* 2.5 mm long, palea crustaceous, *ca* as long as lemma. **Fig. 30B.**

Known from the Darling Downs district, not common. Apparently palatable to stock at least when young.

3. *Panicum bisulcatum* Thunb.**BLACKSEED PANIC**

Panicum acroanthum Steudel; *P. melananthum* F. Muell.

Annual, semi-aquatic, decumbent, rooting at nodes, up to *ca* 80 cm tall; culms often branching, nodes glabrous. Leaf sheaths glabrous except for few cilia on one margin upwards; ligules membranous, less than 1 mm long; leaf blades linear, narrowed upwards, apex acute or acuminate, margin flat, 2–15 cm \times 0.4–1.3 cm, \pm scabrous. Panicles spreading, up to 20 cm long, primary branches up to 10 cm long, pedicels 0.5–5 mm long, spikelets 2.5–3 mm long; lower glume *ca* $\frac{1}{2}$ as long as spikelets, 3–5-nerved, upper glume *ca* as long as spikelet, 5-nerved; lower floret sterile, lemma \pm as long as upper glume, 5-nerved, palea absent; upper floret bisexual, lemma smooth and shining, margins embracing palea, *ca* 2 mm long, palea *ca* as long as lemma. **Fig. 30C.**

Widespread in the Moreton district but not common, also recorded from the Darling Downs and Wide Bay districts, along the edges of streams.

4. *Panicum obseptum* Trin.**WHITE WATER PANIC**

Perennial, semi-aquatic, decumbent, up to 30 cm tall, rooting at nodes; culms weak, branching, nodes sparsely hairy. Leaf sheaths at top of culms glabrous, lower sheaths sparsely hairy; ligules ciliate, less than 1 mm long; leaf blades linear, apex acute to

acuminate, margin flat and \pm scabrous, up to 10 cm \times 0.1–0.4 cm, glabrous or with sparse tubercular-based hairs. Panicles up to 10 cm long, lower branches up to 5 cm long, pedicels 1.5–3 mm long; spikelets *ca* 2.5–3.5 mm long; lower glume *ca* $\frac{1}{4}$ length of spikelet, nerveless or obscurely 1-nerved, upper glume *ca* as long as spikelet, *ca* 9-nerved; lower floret sterile, lemma *ca* as long as upper glume, 5-nerved, palea absent; upper floret bisexual, lemma smooth, \pm shining, *ca* 2.5 mm long, faintly 5–7-nerved, palea *ca* as long as lemma. **Fig. 30D.**

Known from a few places in the Moreton and eastern Darling Downs districts, usually on edges of streams or dams, sometimes in areas subject to periodic inundation.

Sterile it can be mistaken for *Cynodon dactylon* but the two species can be separated on ligule characters.

5. *Panicum pygmaeum* R. Br.

DWARF PANIC

Perennial, decumbent, up to 20 cm tall, creeping and rooting at nodes; culms weak, branching, nodes glabrous or sprinkled with hairs. Leaf sheaths with sparse to moderately dense long tubercular-based hairs; ligules a row of short cilia *ca* 0.5 mm long; leaf blades linear to narrowly ovate, apex acute to acuminate, base sometimes very shortly petiole-like, margin flat and scabrous, 1–4 cm \times 0.1–0.6 cm, often with sparse long tubercular-based hairs. Panicles 2–6 cm long, pedicels 1–2 mm long, occasionally up to 7 mm long; spikelets *ca* 1.5–2.3 mm long, lower glume *ca* $\frac{1}{4}$ length of spikelet, nerves absent, upper glume *ca* as long as spikelet, 5-nerved; lower floret sterile, lemma as long as upper glume, 5-nerved, palea absent; upper floret bisexual, lemma *ca* as long as spikelet, palea *ca* as long as lemma. **Fig. 30E.**

Widespread in the region but most common in the Moreton district, in or near rainforest or dense eucalypt forests.

6. *Panicum lachnophyllum* Benth.

Perennial, decumbent, \pm stoloniferous, up to 30 cm tall, rooting at nodes; culms occasionally branched, nodes pubescent. Leaf sheaths with short tubercular-based hairs; ligules minute; leaf blades linear to linear-ovate, apex acute to acuminate, base \pm petiole-like, margin flat, 1.5–10 cm \times 0.3–0.9 cm, with sparse to \pm dense tubercular-based hairs. Panicles 2–7 cm long, pedicels 0.5–2 mm long; spikelets 2–2.5 mm long; lower glume *ca* $\frac{1}{4}$ length of spikelet, obscurely 1-nerved; upper glume *ca* as long as spikelet, obscurely 5-nerved; lower floret sterile, lemma *ca* as long as spikelet, obscurely 5-nerved, palea absent; upper floret bisexual, lemma embracing sides of palea, 1.75–2 mm long, with few hairs on sides, palea as long as lemma. **Fig. 30F.**

Moreton and Wide Bay districts, in or near rainforest.

7. **Panicum miliaceum* L. MILLET PANIC; PROSO MILLET; FRENCH MILLET
Annual, tufted, 0.2–1.2 m tall; culms erect or ascending, simple or sparingly branched, nodes lightly to densely pubescent. Leaf sheaths hirsute with spreading tubercular-based hairs; ligules a ciliate rim *ca* 1–2 mm long; leaf blades linear, apex long tapering to slender point, base \pm as wide as sheath, rounded and subcordate, margin flat and often ciliate towards base, 15–30 cm \times 0.8–2.5 cm, glabrous except sometimes for minutely hispid midrib below, sometimes loosely hairy with tubercular-based hairs. Panicles up to 30 cm long, but often shorter, primary branches up to $\frac{3}{4}$ length of panicle, pedicels *ca* 2 mm long; spikelets 4–6 mm long; lower glume $\frac{1}{2}$ – $\frac{3}{4}$ length of spikelet, 5–7-nerved, upper glume as long as spikelet, 11–13-nerved; lower floret sterile, lemma similar to upper glume and \pm as long, palea hyaline, up to $\frac{1}{3}$ length of lemma; upper floret bisexual, smooth and shining, lemma crustaceous, margins embracing palea, 3–3.5 mm long, palea crustaceous, *ca* as long as lemma. **Fig. 30G.**

Native of central and western Asia and south-eastern Europe; widely cultivated for its grain as feed for poultry, pigs and aviary birds, possibly naturalized in the Darling Downs and Moreton, districts. It has been suspected of poisoning stock but there is no real evidence.

8. *Panicum subxerophilum* Domin

GILGAI GRASS

Perennial, tufted, 20–70 cm tall; culms rigid, simple or branched, nodes glabrous. Leaf sheaths smooth to \pm scabrous; ligules hyaline, unequal-sided, 1–3.5 mm long, glabrous;

leaf blades linear, narrowing upwards, apex acuminate, margin flat or loosely convolute, 2–12 cm \times 0.15–0.35 cm glabrous or minutely scabrous. Panicles 5–30 cm long and \pm as broad, pedicels 1–3 mm long; spikelets 2–3 mm long; lower glume $\frac{1}{2}$ – $\frac{2}{3}$ length of spikelets, 3–5-nerved, \pm scabrous-tuberculate towards top, upper glume *ca* as long as spikelet, 9-nerved, \pm scabrous-tuberculate upwards; lower floret sterile, lemma *ca* as long as spikelet, 7-nerved, palea small, hyaline; upper floret bisexual, smooth and shining, lemma crustaceous, margins embracing palea, *ca* 2.5 mm long, palea crustaceous, *ca* as long as lemma. **Fig. 30H.**

Western Darling Downs and Burnett districts, often in damp depressions in the soil; moderately common.

9. *Panicum effusum* R. Br.

Perennial or annual, 20–70 cm tall; culms simple or sparingly branched, nodes pubescent, rarely glabrous. Leaf sheaths usually with at least a few tubercular-based hairs; ligules a row of cilia less than 1 mm long; leaf blades linear, gradually attenuate, apex acute, margin flat or loosely involute, 3–25 cm \times 0.1–0.5 cm, usually with at least a few tubercular-based hairs. Panicles up to *ca* 50 cm long, often smaller, primary branches up to 20 cm long, pedicels 1.5–10 mm long; spikelets 2–3 mm long; lower glume *ca* $\frac{1}{2}$ as long as spikelet, 3–5-nerved, upper glume *ca* as long as spikelet, 5–7-nerved; lower floret sterile, lemma slightly shorter than spikelet, faintly 7-nerved, palea *ca* $\frac{1}{2}$ as long as lemma; upper floret bisexual, lemma 1.5–2.25 mm long, 7-nerved, palea *ca* as long as lemma.

Two varieties occur in the region:

- | | |
|--|---------------------------------------|
| 1. Nodes, leaf sheaths and culms distinctly hairy, especially at base;
spikelets not conspicuously 2-coloured | <i>P. effusum</i> var. <i>effusum</i> |
| Nodes, leaf sheaths and culms glabrous or slightly hairy; sterile floret
purplish in colour, bisexual floret golden in colour | <i>P. effusum</i> var. <i>simile</i> |

P. effusum* var. *effusum*, HAIRY PANIC, (Fig. 30I.)** is widespread in the region, usually on better soils in grassland and open woodland. ***P. effusum* var. *simile (Domin) B. Simon (*P. simile* Domin; *P. fulgidum* Hughes; *P. bicolor* auct. non Moench., R. Br.; *P. bisulcatum* auct. non Thunb., S. T. Blake), **TWO COLOUR PANIC**, is widespread in the region, usually on poor \pm sandy soils in grassland or open woodland. Both are apparently freely eaten by stock. The species is suspected of causing photosensitization in sheep.

10. **Panicum novemnerve* Stapf

Annual, often decumbent, up to *ca* 90 cm tall; culms mostly branched, nodes 8, pubescent. Leaf sheaths hirsute with tubercular-based hairs; ligules membranous, up to *ca* 1 mm long, minutely ciliate; leaf blades linear or linear-ovate, narrowing upwards, apex acuminate, margin flat, scabrous, 7.5–20 cm \times 0.4–1.2 cm, usually with few often deciduous tubercular-based hairs. Panicles up to 24 cm long but often smaller, branches spreading, pedicels 2–10 mm long; spikelets *ca* 2–2.5 mm long; lower glume *ca* $\frac{1}{2}$ as long as spikelet, 5-nerved, upper glume *ca* as long as spikelet, 9-nerved; lower floret sterile, lemma *ca* $\frac{1}{2}$ as long as spikelet, 9-nerved, palea *ca* $\frac{1}{2}$ – $\frac{2}{3}$ length of lemma; upper floret bisexual, lemma crustaceous, glossy and dark brown when mature, margins embracing palea, *ca* 2 mm long, palea *ca* as long as lemma. **Fig. 30J.**

Native of southern Africa; recorded once from the region, from the Burnett district, apparently prefers heavy soils.

11. **Panicum maximum* Jacq.

Urochloa maxima (Jacq.) R. Webster

Perennial, tufted, up to *ca* 3 m tall, rhizome short; culms \pm erect or rarely decumbent and rooting at lower nodes, simple or sparingly branched, nodes usually densely hirsute, rarely glabrous. Leaf sheaths glabrous to hirsute with tubercular-based hairs, often densely bearded at junction with blade; ligules membranous, densely ciliate, *ca* 1.5 mm long; leaf blades linear, tapering to fine point, margin flat and scabrous, 15–70 cm \times 0.5–2 cm, glabrous to hirsute with tubercular-based hairs. Panicles up to 50 cm long, lower branches up to 30 cm long, pedicels mostly 1–5 mm long; spikelets 2.8–4 mm long; lower glume $\frac{1}{4}$ – $\frac{1}{3}$ length of spikelet, 1–3-nerved or apparently nerveless, upper glume *ca*

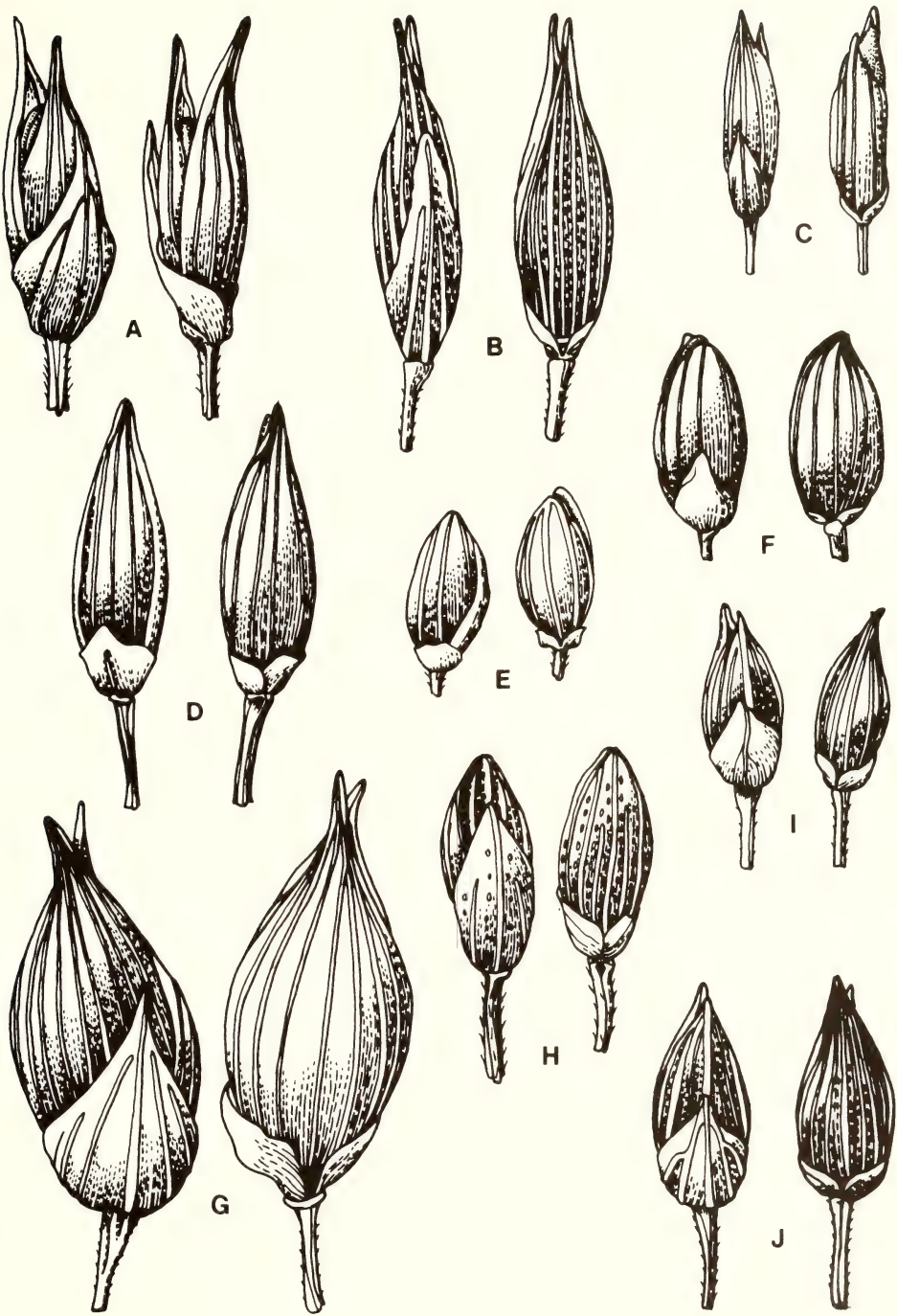


Fig. 30 POACEAE — A–J *Panicum* spp. — front and back views of spikelets, all $\times 12$; A *P. queenslandicum*; B *P. prolutum*; C *P. bisulcatum*; D *P. obseptum*; E *P. pygmaeum*; F *P. lachnophyllum*; G *P. miliaceum*; H *P. subxerophilum*; I *P. effusum* var. *effusum*; J *P. novemnerve*.

as long as spikelet, 5-nerved; lower floret male, lemma *ca* as long as spikelet, 5-7-nerved, palea slightly shorter than lemma; upper floret bisexual, lemma thinly crustaceous, rugose, 2-2.5 mm long, palea *ca* as long as lemma.

Three varieties occur in the region:

- | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Spikelets softly hairy | . | . | . | . | . | . | . | . | <i>P. maximum</i> var. <i>trichoglume</i> | |
| Spikelets glabrous | . | . | . | . | . | . | . | . | . | 2 |
| 2. Leaves hairy at junction of sheath and blade | . | . | . | . | . | . | . | . | <i>P. maximum</i> var. <i>coloratum</i> | |
| Leaves glabrous at junction of sheath and blade | . | . | . | . | . | . | . | . | <i>P. maximum</i> var. <i>maximum</i> | |

P. maximum* var. *trichoglume Eyles ex Robyns, (*Urochloa maxima* (Jacq.) R. Webster var. *trichoglume* (Eyles ex Robyns) R. Webster) (**Fig. 31A.**) GREEN PANIC, native of southern Africa, is widely cultivated as a fodder plant and apparently naturalized in the Moreton district. ***P. maximum* var. *coloratum*** C. T. White, probably native of Africa, is cultivated for fodder and naturalized in eastern parts of the region. ***P. maximum* var. *maximum***, GUINEA GRASS, native of Africa, is widely cultivated for fodder and naturalized in eastern parts of the region. All three varieties are valuable fodder grasses and a number of cultivars are widely cultivated for fodder.

A cultivar ***P. maximum* var. *maximum* cv. Embu** is probably also naturalized in the Moreton district. It has decumbent culms rooting at the nodes.

12. **Panicum repens* L.

TORPEDO GRASS

Perennial, up to *ca* 90 cm tall, rhizomatous, rhizomes branching and often extensively creeping; culms erect or ascending, simple, clothed at base with bladeless overlapping sheaths, nodes glabrous. Leaf sheaths glabrous to \pm pilose; ligules ciliate, less than 1 mm long; leaf blades linear, apex acute, base contracted, margin flat or loosely involute, 4-20 cm \times 0.2-0.6 cm, long pilose on upper surface towards base, otherwise glabrous or sparsely pilose. Panicles up to 15 cm long, branches ascending, up to *ca* 10 cm long, pedicels 0.5-3 mm long; spikelets *ca* 2.5 mm long; lower glume $\frac{1}{5}$ - $\frac{1}{3}$ as long as spikelet, 3-nerved, upper glume \pm as long as spikelet, 7-nerved; lower floret male, lemma *ca* as long as spikelet, 7-nerved, palea slightly shorter; upper floret bisexual, lemma smooth, *ca* 2 mm long, nerves inconspicuous, palea *ca* as long as lemma. **Fig. 31B.**

Widespread in tropical and subtropical parts of the world, cultivated as a pasture grass in some parts of the world; apparently naturalized in the Moreton and Burnett districts. It is palatable to stock but is aggressive and may become a nuisance as it is difficult to eradicate once established.

13. **Panicum gilvum* Launert

Panicum laevifolium var. *contractum* Pilger; *P. schinzii* auct. non Hackel

Annual, tufted, up to 80 cm tall; culms branching, nodes glabrous. Leaf sheaths \pm glabrous or with sparse tubercular-based hairs, sometimes basal sheaths sparsely hairy; ligules a membranous rim with ciliate margin, mostly 1-2 mm long; leaf blades linear, apex acute to acuminate, base slightly rounded into sheath, margin flat or loosely folded, 5-20 cm \times 0.2-1 cm, glabrous. Panicles up to 30 cm long, often smaller, primary branches up to 20 cm long, pedicels 2-8 mm long; spikelets 2-3 mm long but mostly *ca* 2.5 mm long; lower glume *ca* $\frac{1}{8}$ - $\frac{1}{4}$ as long as spikelet, nerveless or obscurely nerved, upper glume \pm as long as spikelet, mostly 7-9-nerved; lower floret male in Queensland, lemma as long as spikelet, 7-9-nerved, palea \pm equal to lemma; upper floret bisexual, lemma smooth and shining, *ca* 2 mm long, obscurely 5-7-nerved, palea similar in texture and colour to lemma, *ca* as long as lemma. **Fig. 31C.**

Native of southern Africa; probably naturalized in the Moreton district. A palatable fodder grass.

14. **Panicum antidotale* Retz.

GIANT PANIC; BLUE PANIC

Perennial, robust, shortly rhizomatous, 0.3-1.5 m tall; culms rigid, highly branched, nodes glabrous to pubescent. Leaf sheaths glabrous or sprinkled with long tubercular-based hairs; ligules membranous with dense cilia, whole *ca* 1.25 mm long; leaf blades linear, apex long attenuate into slender often curved or flexuose tip, margin flat and scabrous, 15-30 cm \times 0.4-1.5 cm, glabrous or rarely sprinkled with tubercular-based hairs. Panicles 10-30 cm long, sometimes longer, lower branches fascicled, *ca* 5-11 cm long, pedicels 1-1.5 mm long; spikelets 2.5-3.5 mm long; lower glume mostly $\frac{1}{3}$ - $\frac{1}{2}$ length of spikelet, 3-5-nerved, upper glume slightly shorter than spikelet, 7-9-nerved,

rarely 11-nerved; lower floret male, lemma *ca* as long as spikelet, 7–11-nerved, palea membranous, margins reflexed, *ca* as long as lemma; upper floret bisexual, smooth and shining, lemma thinly crustaceous, margins embracing palea, 2.5 mm long, obscurely nerved; palea thinly crustaceous, *ca* as long as lemma. **Fig. 31D.**

Native of drier parts of south-western Asia; cultivated for fodder and possibly naturalized in the Darling Downs and Burnett districts.

15. *Panicum larcomianum* Hughes

Perennial, tufted, up to *ca* 90 cm tall; culms simple or branched, nodes glabrous. Leaf sheaths glabrous; ligules membranous, ciliate, *ca* 1 mm long; leaf blades linear, attenuate, apex \pm pungent, margin convolute, 6–20 cm \times 0.1–0.15(–2) cm, glabrous. Panicles up to 20 cm long, lower branches up to *ca* 15 cm long, pedicels 1–4 mm long; spikelets *ca* 2.5 mm long; lower glume $\frac{1}{4}$ – $\frac{2}{5}$ length of spikelet, 3–5-nerved, upper glume *ca* as long as spikelet, 7–9-nerved; lower floret sterile, lemma *ca* as long as spikelet, 7–9-nerved, palea less than $\frac{1}{2}$ length of lemma; upper floret bisexual, lemma *ca* 2 mm long, palea *ca* as long as lemma. **Fig. 31E.**

Widespread in the region, usually on or near creek or river banks; not common.

16. *Panicum buncei* F. Muell. ex Benth.

Perennial, tufted, up to *ca* 80 cm tall; culms \pm erect, simple or with few branches, nodes glabrous or minutely hairy. Leaf sheaths with few tubercular-based hairs or \pm glabrous; ligules membranous, ciliate, less than 1 mm long; leaf blades linear, attenuate upwards, apex acuminate, margin usually flat or sometimes folded to involute on drying, 10–20 cm \times 0.15–0.5 cm, \pm glabrous or with few tubercular-based hairs. Panicles up to 30 cm long, often much less, lower branches up to 17 cm long, pedicels 1–3 mm long; spikelets 3–4.5 mm long; lower glume *ca* $\frac{1}{3}$ length of spikelet, 5–7-nerved, upper glume slightly shorter than lower lemma, 5–7-nerved; lower floret sterile, rarely male, lemma *ca* as long as spikelet, 7–9-nerved, palea *ca* $\frac{3}{4}$ length of lemma; upper floret bisexual, lemma embracing sides of palea, *ca* 1.75–2 mm long, palea slightly shorter than lemma. **Fig. 31F.**

Western Darling Downs district, sometimes found elsewhere in the Darling Downs and Moreton districts, usually on heavy soils, often in cleared brigalow country; moderately common. It is regarded as a useful fodder plant.

17. *Panicum paludosum* Roxb.

SWAMP PANIC

Panicum decompositum R. Br. var. *paludosum* Trin.; *P. proliferum* auct. non Lam., F. M. Bailey

Annual or perennial, aquatic, erect and up to 1.5 m tall, or with stems floating on water, sometimes rooting at nodes; culms sometimes branching, nodes glabrous. Leaf sheaths glabrous; ligules membranous, ciliate, *ca* 3 mm long; leaf blades linear, apex acute, margin flat, 10–30 cm \times 0.5–2 cm, glabrous. Panicles up to *ca* 30 cm long, lower branches up to *ca* 15 cm long, pedicels 1–4 mm long; spikelets 3.5–4.5 mm long; lower glume *ca* $\frac{1}{4}$ – $\frac{1}{3}$ length of spikelet, obscurely 1–3-nerved, upper glume *ca* as long as spikelet, 7–9-nerved; lower floret sterile, lemma *ca* as long as upper glume, 9-nerved, palea *ca* $\frac{3}{4}$ length of lemma; upper floret bisexual, lemma *ca* 2.5–2.75 mm long, obscurely 5-nerved, palea *ca* as long as lemma. **Fig. 31G.**

Widespread in eastern Moreton district, also recorded from near Bundaberg in the Wide Bay district, in shallow still waters and gently flowing streams.

18. *Panicum decompositum* R. Br.

NATIVE MILLET; AUSTRALIAN MILLET

Panicum proliferum Lam. var. *decompositum* (R. Br.) Thell.; *P. decompositum* var. *typicum* Domin

Perennial, densely tufted, mostly up to 90 cm tall, sometimes taller, usually pale glaucous-green; culms mostly simple, nodes glabrous to densely hairy. Leaf sheaths glabrous or with few tubercular-based hairs; ligules membranous, ciliate, *ca* 2 mm long; leaf blades linear, apex acute or acuminate, margin flat or sometimes \pm inrolled when dry, up to 50 cm \times 0.3–1 cm, glabrous or sprinkled with long tubercular-based hairs. Panicles up to *ca* 35 cm long, lower branches rigid and straight, becoming flattened and

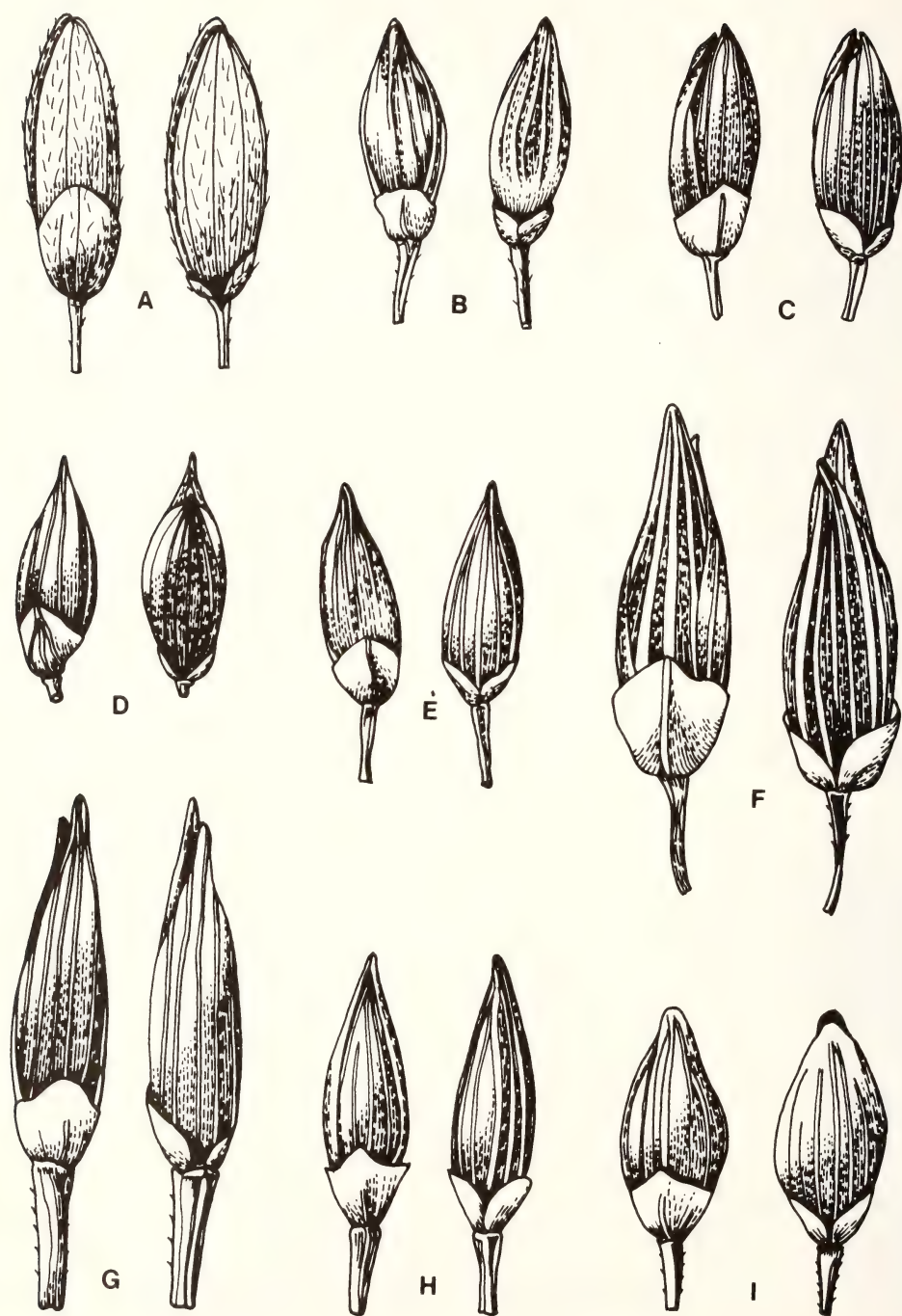


Fig. 31 POACEAE — A–I *Panicum* spp. — front and back views of spikelets, all $\times 12$; A *P. maximum* var. *trichoglume*; B *P. repens*; C *P. gilvum*; D *P. antidotale*; E *P. larcomianum*; F *P. buncei*; G *P. paludosum*; H *P. decompositum*; I *P. laevinode*.

broad towards their bases, up to *ca* 17 cm long, pedicels 1–4 mm long; spikelets 2.5–3.5 mm long; lower glume *ca* $\frac{1}{4}$ – $\frac{1}{3}$ length of spikelet, nerves 1 or absent, upper glume *ca* as long as spikelet, 7-nerved; lower floret sterile, lemma *ca* as long as upper glume, 7-nerved, palea $\frac{2}{3}$ – $\frac{7}{8}$ as long as lemma; upper floret bisexual, lemma with beak-like apex, *ca* 2 mm long, palea *ca* as long as lemma. **Fig. 31H.**

Widespread in the region, most common in the Darling Downs and Moreton districts. It is regarded as good fodder when young.

19. *Panicum laevinode* Lindl.

PEPPER GRASS

Panicum whitei J. M. Black

Annual, rarely biennial, tufted, mostly much less than 1 m tall but occasionally up to 1.5 m tall, usually pale green to yellowish green; culms simple or branched, nodes glabrous or hairy. Leaf sheaths glabrous or with long tubercular-based hairs; ligules membranous, ciliate, 1–2 mm long; leaf blades linear, apex acute to acuminate, margin flat, 5–20 cm \times 0.25–0.6 cm, glabrous or with few tubercular-based hairs. Panicles 5–20 cm long, lower branches up to 17 cm long, slender, pedicels 0.5–5 mm long; spikelets 2.5–3.5 mm long; lower glume *ca* $\frac{1}{3}$ as long as spikelet, obscurely 1–5-nerved or nerveless, upper glume *ca* as long as spikelet, 7–9-nerved; lower floret sterile, lemma *ca* as long as upper glume, 7–9-nerved, palea *ca* $\frac{3}{4}$ as long as lemma; upper floret bisexual, lemma with beak-like apex, *ca* 2 mm long, palea *ca* as long as lemma. **Fig. 31I.**

Western Darling Downs district, usually on heavy soils; rare. Apparently palatable and nutritious to stock.

71. ANCISTRACHNE S. T. Blake

Perennials. Ligules a dense row of short hairs; leaf blades flat. Inflorescences sparsely branched panicles or racemes; spikelets solitary, florets 2, lower sterile, upper bisexual; glumes unequal, lower shorter than spikelet or minute or absent, 3–5-nerved, upper *ca* as long as spikelet, 5–11-nerved; lower floret with lemma similar to upper glume, as long as spikelet, 7–9-nerved, palea *ca* $\frac{1}{3}$ as long as lemma or absent; upper floret with lemma as long as or shorter than spikelet, 5–7-nerved, palea *ca* as long as lemma and enclosed by it, 2-nerved; stamens 3; styles distinct.

3 species, Australia and the Philippines; 2 species Australia; 1 species south-eastern Queensland.

1. *Ancistrachne uncinulata* (R. Br.) S. T. Blake

HOOKY GRASS

Panicum uncinulatum R. Br.

Up to *ca* 2 m tall; culms striate, densely papillose. Leaf sheaths with few-many tubercular-based hairs; leaf blades soon deflexed, 1–6 cm \times 0.15–0.4 cm, glabrous below, \pm pilose above. Inflorescences up to *ca* 14 cm long, pedicels up to *ca* 3 mm long; spikelets 4–5 mm long; lower glume 1–2.5 mm long, 3–5-nerved, upper glume slightly shorter than spikelet, with moderately dense tubercular-based hooked hairs, 9–11-nerved; lower floret with lemma as long as floret, with moderately dense tubercular-based hairs, 7–9-nerved, palea absent; upper floret *ca* $\frac{4}{5}$ as long as spikelet. **Fig. 32A.**

Widespread in the region, often in drier parts in open woodland communities. It is freely eaten by stock.

72. SACCIOLEPIS Nash

Annuals or perennials. Ligules membranous; leaf blades flat or convolute. Inflorescences spike-like panicles, often dense; spikelets solitary, florets 2, lower male or sterile, upper bisexual; glumes unequal, lower glumes shorter, sometimes reduced to a colourless scale, upper glume with a curved or basally gibbous or saccate back, 5–13-nerved, but mostly 7–9-nerved; lower floret with lemma dissimilar to upper glume, straight-backed, *ca* as long as upper glume, palea narrow, shorter than lemma or rudimentary; upper floret with lemma curved on back, obscurely 5-nerved, embracing palea, palea *ca* as long as lemma; stamens 3; styles distinct. Caryopses tightly enclosed by somewhat hardened lemma and palea.

About 30 species, mostly tropical and subtropical regions of the world; 2 species Australia; 1 species south-eastern Queensland.

1. *Sacciolepis indica* (L.) Chase

INDIAN CUPSCALE GRASS

Aira indica L.

Annual, tufted, erect or spreading, sometimes decumbent and rooting at nodes, mostly 5–70 cm tall, rarely taller; culms slender, smooth, nodes glabrous. Leaf sheaths \pm glabrous in Australian specimens; ligules up to 0.5 mm long; leaf blades linear, apex acuminate, margin flat, 2–10 cm \times 0.2–0.5 cm, glabrous to minutely scabrous. Panicles 1–9 cm \times 0.4–0.8 cm; spikelets 2–4 mm long; lower glume *ca* $\frac{1}{2}$ as long as spikelet, 3–5-nerved, glabrous, upper glume strongly incurved, gibbous towards base, *ca* as long as spikelet, 7–9-nerved, glabrous or with stiff tubercular-based hairs in upper part; lower floret sterile, lemma \pm as long as upper glume, 7–9-nerved, glabrous or with stiff tubercular-based hairs, palea small, \pm bristle-like; upper floret bisexual, smooth and shining, lemma *ca* 1.5–1.75 mm long, palea *ca* as long as lemma. **Fig. 32B.**

Mainly Moreton district, but also known from the Wide Bay district and south-eastern Darling Downs district, on mud alongside streams, swamps, etc.

73. *SETARIA* Beauv.

Annuals or perennials. Ligules usually reduced to a ciliate rim; leaf blades usually flat, rarely plicate. Inflorescences spike-like or open and spreading panicles, spikelets subtended by 1–several persistent bristles, rarely bristles absent; spikelets solitary, florets 2, lower male or sterile, upper bisexual; glumes unequal, lower smaller than upper, 1–7-nerved but mostly 3–5-nerved, upper glume curved on back, from $\frac{1}{3}$ to as long as spikelet, 3–9-nerved, but mostly 5–7-nerved; lower floret with lemma \pm as long as spikelet, 5–7-nerved, palea mostly *ca* as long as lemma, sometimes smaller or not developed; upper floret with lemma curved on back, *ca* as long as spikelet, palea *ca* as long as lemma; stamens 3; styles distinct. Caryopses tightly enclosed in hardened lemma and palea.

About 140 species, tropics and subtropics of the world; *ca* 15 species Australia; 10 species south-eastern Queensland.

- | | | |
|--|----------------------------|---|
| 1. Leaf blades conspicuously folded fan-like between nerves | 1. <i>S. palmifolia</i> | |
| Leaf blades not folded between nerves (occasionally slightly so in dry specimens of <i>S. australiensis</i>) | | 2 |
| 2. Bristles retrorsely barbed | 2. <i>S. verticillata</i> | |
| Bristles antrorsely barbed | | 3 |
| 3. Spikelets not falling as a whole at maturity, upper floret falling at maturity, leaving glumes and lower floret attached to inflorescence | | |
| Spikelets falling as a whole | 3. <i>S. italica</i> | 4 |
| 4. Panicles contracted but not spike-like, mostly 1–2 cm wide | 4. <i>S. australiensis</i> | |
| Panicles spike-like, up to 1 cm wide | | 5 |
| 5. Upper glumes $\frac{3}{4}$ to as long as spikelet | | 6 |
| Upper glumes $\frac{1}{2}$ – $\frac{2}{3}$ length of spikelet | | 7 |
| 6. Paleas of lower florets <i>ca</i> $\frac{1}{2}$ length of lemma; lower glume $\frac{1}{4}$ – $\frac{1}{3}$ length of spikelet | 5. <i>S. viridis</i> | |
| Paleas of lower florets <i>ca</i> as long as lemma; lower glume $\frac{1}{2}$ – $\frac{3}{4}$ length of spikelet | 6. <i>S. surgens</i> | |
| 7. Plants annual; upper glume 5–9-nerved | 7. <i>S. pumila</i> | |
| Plants perennial; upper glume 5-nerved or 7–9-nerved | | 8 |
| 8. Upper glumes 7–9-nerved; lower glume 3–5-nerved | 8. <i>S. incrassata</i> | |
| Upper glumes 5-nerved; lower glume 3-nerved | | 9 |
| 9. Spikelets solitary on each branch of panicle; anthers less than 1 mm long | 9. <i>S. gracilis</i> | |
| Spikelets 1–4 on each branch of panicle, sometimes 1 or 2 abortive; anthers 1.5–2 mm long | 10. <i>S. sphacelata</i> | |

1. *Setaria palmifolia (Koenig) Stapf**PALM GRASS***Panicum palmaefolium* Koenig

Perennial, usually erect but sometimes culms prostrate in lower parts and rooting from nodes, mostly *ca* 1 m tall but cultivated specimens can reach 3 m in height; culms robust, branching, nodes with appressed hairs. Leaf sheaths with tubercular-based hairs in upper half or glabrous; ligules a dense row of hairs; leaf blades conspicuously plicate, palm-like, linear-elliptic, tapering to apex and base, almost petiolate in lower leaves, up to 90 cm \times 12 cm, glabrous or with long soft tubercular-based hairs which leave scabrous surface after falling. Panicles loose, up to 80 cm \times 40 cm, branches up to 30 cm long and \pm pendulous, pedicels often bearing a scabrous bristle below spikelet, bristle up to *ca* 10 mm long; spikelets 2.5–3.5 mm long; lower glume *ca* $\frac{1}{3}$ length of spikelet, 5-nerved, upper glume $\frac{2}{3}$ – $\frac{3}{4}$ length of spikelet, 5–7-nerved; lower floret sterile or male, lemma 5-nerved, palea $\frac{1}{2}$ – $\frac{3}{4}$ length of lemma.

Native of the tropics of Asia, widely cultivated as an ornamental; apparently naturalized in one or two places in the Moreton district.

2. *Setaria verticillata (L.) Beauv.**WHORLED PIGEON GRASS***Panicum verticillatum* L.; *Setaria adhaerens* (Forssk.) Chiov.; *S. carnei* A. S. Hitchc.

Annual, loosely tufted, up to 1 m tall; culms erect, simple or branching, nodes glabrous. Leaf sheaths hairy or glabrous; ligules *ca* 1 mm long, ciliate; leaf blades linear or linear-ovate, apex acuminate, 5–30 cm \times 0.3–1.2 cm, scabrous on both surfaces, upper surface often also with scattered hairs. Panicles spike-like, 2.5–15 cm \times 0.4–2.5 cm excluding bristles, bristles 1 below each spikelet, 4–10 mm long, retrorsely scabrous; spikelets *ca* 2 mm long; lower glume *ca* $\frac{1}{3}$ length of spikelet, 1–3-nerved, upper glume as long as spikelet, 5-nerved; lower floret sterile, lemma 5-nerved, palea *ca* $\frac{1}{2}$ as long as lemma.

Fig. 32C.

Native of tropical and subtropical Asia and Africa; naturalized, widespread in the Moreton and Darling Downs districts, a weed in cultivation or disturbed land; not common.

3. *Setaria italica (L.) Beauv.**FOXTAIL MILLET; ITALIAN MILLET***Panicum italicum* L.

Annual, tufted, up to 1.5 m tall; culms erect, simple or branching, nodes glabrous. Leaf sheaths glabrous or with few fine tubercular-based hairs; ligules a fringe of cilia; leaf blades linear-ovate, tapering to fine point, 15–45 cm \times 0.6–2 cm, scabrid on upper surface. Panicles spike-like, continuous or \pm lobed, 2.5–30 cm \times 0.8–3 cm excluding bristles, bristles 1–5 in a cluster subtending a cluster of 2–4 spikelets, each bristle 0.4–1.5 cm long; spikelets 2–3.5 mm long; lower glume *ca* $\frac{1}{3}$ length of spikelet, 1–3-nerved, upper glume $\frac{2}{3}$ – $\frac{7}{8}$ length of spikelet, 5–7-nerved; lower floret sterile, lemma 5-nerved, palea a hyaline scale or absent.

Origin unknown, but cultivated for grain and fodder throughout warmer parts of the world; a number of cultivars are cultivated in the region and the species has been reported naturalized in a few places, usually in disturbed sites.

4. Setaria australiensis (Lams.-Scribn. & Merr.) Vickery**SCRUB PIGEON GRASS***Chaetochloa australiensis* Lams.-Scribn. & Merr.

Perennial, tufted, up to *ca* 2 m tall; culms cane-like, erect, simple or branching near base, nodes glabrous. Leaf sheaths glabrous or with few hairs towards top; ligules 2–3 mm long, with dense stiff hairs; leaf blades flat or sometimes somewhat plicate when dry, long tapering, 20–40 cm \times 0.5–2 cm, scabrous. Inflorescences loosely contracted panicles of racemes, 6–20 cm \times (0.8–)1–2(–3) cm excluding bristles, bristles 1–3 below each spikelet, 0.8–2 cm long; spikelets 3–4 mm long; lower glume $\frac{1}{3}$ – $\frac{1}{2}$ length of spikelet, 3–5-nerved, rarely \pm 7-nerved, upper glume $\frac{3}{4}$ – $\frac{7}{8}$ length of spikelet, 7–11-nerved; lower floret sterile, lemma 5–7-nerved, palea *ca* as long as lemma.

Widespread in the region, usually near creeks or swamps; rare.

5. *Setaria viridis (L.) Beauv.**GREEN PIGEON GRASS***Panicum viride* L.

Annual, loosely tufted, mostly 10–60 cm tall, rarely taller; culms erect, simple or branching, nodes glabrous. Leaf sheaths glabrous or with few tubercular-based hairs;

ligules ciliate fringe of hairs; leaf blades linear-ovate, tapering to fine point, base slightly constricted, 3–30 cm \times 0.4–1 cm, minutely scabrous. Panicles spike-like, 1–10 cm \times 0.4–1 cm excluding bristles, bristles 1–3 below each spikelet, up to *ca* 10 mm long; spikelets *ca* 1.8–2.5 mm long; lower glume $\frac{1}{4}$ – $\frac{1}{3}$ length of spikelet, 1–3-nerved, upper glume as long as spikelet, 5-nerved; lower floret sterile, lemma 5–7-nerved, palea up to *ca* $\frac{1}{2}$ length of lemma.

Widespread in warm parts of the world; possibly naturalized in the Moreton district.

6. *Setaria surgens* Stapf

Setaria glauca (L.) Beauv. var. *minor* F. M. Bailey; *S. glauca* var. *pulchella* F. M. Bailey; *S. glauca* var. *minutissima* F. M. Bailey

Annual, tufted, up to *ca* 60 cm tall, rarely taller; culms ascending or erect, nodes glabrous. Leaf sheaths glabrous; ligules minute, ciliate; leaf blades linear, long tapering, 8–15 cm \times 0.2–0.4 cm, glabrous or with few long fine hairs. Panicles spike-like, 2–5 cm \times *ca* 0.5 cm excluding bristles, bristles 4–8 below each spikelet, 0.8–1.2(–1.5) cm long; spikelets 2.5–3 mm long, lower glume $\frac{1}{2}$ – $\frac{3}{4}$ length of spikelet, 3–5-nerved, upper glume at first \pm equal to spikelet, at length $\frac{3}{4}$ – $\frac{4}{5}$ length of spikelet, 5–7-nerved; lower floret sterile, lemma 5–7-nerved, palea slightly shorter than lemma.

Widespread in the region, usually on sandy soils.

7. **Setaria pumila* (Poir.) Roemer & Schultes

PALE PIGEON GRASS

Panicum pumilum Poir.

Annual, tufted, up to *ca* 80 cm tall; culms erect, simple or branching at base, nodes glabrous. Leaf sheaths glabrous; ligules *ca* 1–1.5 mm long, ciliate; leaf blades linear or linear-ovate, apex acuminate, 10–30 cm \times 0.4–1 cm, glabrous or with few long hairs above, often slightly scabrous above. Panicles spike-like, 1–15 cm \times 0.6–0.8 cm excluding bristles, bristles 4–12 together subtending a cluster consisting of a perfect spikelet and sometimes 1 or more abortive spikelets, 3–10 mm long; spikelets up to 3.4 mm long; lower glume $\frac{1}{3}$ – $\frac{2}{5}$ as long as spikelet, 3–5-nerved, upper glume $\frac{2}{5}$ – $\frac{3}{5}$ as long as spikelet, 5–9-nerved; lower floret sterile, rarely male, lemma 5-nerved, palea \pm as long as lemma; upper floret with horizontally wrinkled lemma.

Two subspecies occur in the region:

- | | | | | | | | | |
|------------------------------------|---|---|---|---|---|---|---|--|
| 1. Spikelets less than 2.5 mm long | . | . | . | . | . | . | . | <i>S. pumila</i> subsp. <i>pallide-fusca</i> |
| Spikelets 3 mm or more long | . | . | . | . | . | . | . | <i>S. pumila</i> subsp. <i>pumila</i> |

S. pumila subsp. *pallide-fusca* (Schumacher) B. Simon (*Panicum pallide-fusca* Schumacher; *S. pallide-fusca* (Schumacher) Stapf & Hubbard; *S. glauca* (L.) Beauv. var. *pallide-fusca* (Schumacher) Koyama) and *S. pumila* subsp. *pumila* (*S. glauca* auct. non (L.) Beauv.; *S. lutescens* (Weigel) Hubbard) (Fig. 32D.) are natives of warmer parts of Asia and Africa; both subspecies are naturalized in the region, the former in eastern parts of the region, the latter being widespread throughout the region, often as weeds of cultivation or other disturbed sites. Both subspecies are considered palatable to stock.

8. **Setaria incrassata* (Hochst.) Hackel

Panicum incrassatum Hochst.; *Setaria porphyrantha* Stapf

Perennial, tufted, up to 2 m tall; culms decumbent and rooting at nodes, simple or branching, nodes pubescent or glabrous. Leaf sheaths \pm glabrous; ligules *ca* 1.5 mm long, ciliate; leaf blades linear, long tapering, 10–60 cm \times 0.1–0.15 cm, \pm scabrous, \pm glabrous. Panicles spike-like, 3–30 cm \times 0.5–0.8 cm excluding bristles, bristles *ca* 4 below each spikelet, 0.2–1.5 cm long; spikelets *ca* 2–3 mm long; lower glume $\frac{1}{3}$ – $\frac{2}{3}$ length of spikelet, 3–5-nerved, upper glume $\frac{2}{3}$ length of spikelets, mostly 7–9-nerved; lower floret male, lemma *ca* 5-nerved, palea *ca* as long as lemma.

Native of Africa; introduced as a pasture plant, possibly naturalized in the Moreton district.

9. **Setaria gracilis* Kunth

SLENDER PIGEON GRASS

Setaria geniculata (Lam.) Beauv.

Perennial, tufted, up to 1.2 m tall; culms erect, spreading or ascending, simple or branching, nodes glabrous. Leaf sheaths glabrous; ligules *ca* 1 mm long, densely ciliate; leaf blades linear, long tapering, 10–12(–25) cm \times 0.2–0.4(–0.8) cm, scabrous, glabrous

or with few hairs above. Panicles spike-like, cylindrical, 1–10 cm × 0.4–0.8 cm excluding bristles, bristles mostly 4–12 below each spikelet, 0.3–1.2 cm long; spikelets 2–3 mm long; lower glume $\frac{1}{3}$ – $\frac{2}{5}$ length of spikelet, 3-nerved, upper glume $\frac{1}{2}$ – $\frac{2}{3}$ length of spikelet, 5-nerved; lower floret male or sterile, lemma 5–7-nerved, palea as long as lemma. **Fig. 32E.**

Native of warmer parts of North and South America; naturalized in the region, often found as a weed of disturbed sites, roadsides, etc. It is not particularly palatable to stock.

10. **Setaria sphacelata* (Schumacher) Stapf & Hubbard ex Moss **SOUTH AFRICAN PIGEON GRASS**

Panicum sphacelatum Schumacher

Perennial, tufted, up to 3 m tall; culms erect or ascending, simple or branching in lower part, nodes glabrous. Leaf sheaths glabrous or rarely ± hairy; ligules *ca* 1.5 mm long, ciliate; leaf blades linear, mostly 15–30 cm × 0.3–1.7 cm, glabrous or rarely softly hairy towards base. Panicles spike-like, cylindrical, 7–50 cm × 0.6–1 cm excluding bristles, bristles 6–10, subtending branchlets with 1–4 spikelets, 4–6 mm long; spikelets 1.2–3 mm long; lower glume *ca* $\frac{1}{3}$ – $\frac{1}{2}$ length of spikelet, 3-nerved, upper glume $\frac{1}{3}$ – $\frac{2}{3}$ length of spikelet, 5-nerved; lower floret mostly male, rarely sterile, lemma 5-nerved, palea as long as lemma.

Two varieties occur in the region:

- | | |
|--|--|
| 1. Inflorescences 7–25 cm long; culms up to 2 m tall, 0.3–0.6 cm diameter; leaf blades 0.3–1 cm wide | <i>S. sphacelata</i> var. <i>sericea</i> |
| Inflorescences 20–50 cm long; culms up to 3 m tall, 0.6–1.2 cm diameter; leaf blades 1–1.7 cm wide | <i>S. sphacelata</i> var. <i>splendida</i> |

S. *sphacelata* var. *sericea* (Stapf) W. D. Clayton (*S. anceps* Stapf var. *sericea* Stapf; *S. anceps* Stapf) is a native of Africa, introduced and cultivated as a pasture plant and naturalized in the Moreton, Wide Bay and eastern Darling Downs districts. **S. *sphacelata* var. *splendida*** (Stapf) W. D. Clayton (*S. splendida* Stapf) is a native of eastern Africa, introduced and cultivated as a pasture plant and possibly naturalized in the Moreton district. Plants of the species contain oxalates and can be poisonous to cattle under certain conditions.

74. ECHINOCHLOA Beauv.

Annuals or perennials. Ligules absent or represented by transverse fringe of hairs; leaf blades flat. Inflorescences panicles of racemes; spikelets paired, rarely solitary on short side branches and forming 4 or more, rarely 2 rows, florets usually 2, dissimilar, lower male or sterile, upper bisexual; glumes unequal, lower smaller than upper, 3–5-nerved, upper glume ± equal to or slightly shorter than spikelet, 3–7-nerved, sometimes produced into short awn; lower floret with lemma similar in length to upper glume, often with an awn, palea absent or up to length of lemma; upper floret with lemma very convex on back, usually *ca* as long as spikelet, faintly 5-nerved, palea subequal to lemma; stamens 3, styles distinct. Caryopses enclosed in lemma and palea.

About 30 species from tropical and temperate regions of the world; *ca* 16 species Australia; 7 species south-eastern Queensland.

- | | | | | | | |
|---|---|---|---|---|---------------------------|---|
| 1. Panicles compact; spikelets densely crowded, at maturity turgid and subglobose, not awned | . | . | . | . | . | 2 |
| Panicles not compact; spikelets not densely crowded, never turgid and subglobose, often awned | . | . | . | . | . | 3 |
| 2. Spikelets ± purplish to blackish brown; caryopses brownish | . | . | . | . | 1. <i>E. utilis</i> | |
| Spikelets pale; caryopses whitish | . | . | . | . | 2. <i>E. frumentacea</i> | |
| 3. Panicles ± drooping, branches with secondary branching | . | . | . | . | 3. <i>E. crus-pavonis</i> | |
| Panicles ± erect, branches simple | . | . | . | . | . | 4 |
| 4. Spikelets arranged in 4 irregular rows; caryopses whitish | . | . | . | . | 4. <i>E. colona</i> | |
| Spikelets not arranged in 4 rows; caryopses pale yellowish to pale brownish | . | . | . | . | . | 5 |
| 5. At least some of upper glumes awned, awns up to 7 mm long | . | . | . | . | 5. <i>E. telmatophila</i> | |
| Upper glumes not or scarcely awned | . | . | . | . | . | 6 |

6. Spikelets 2.5–3.5 mm long; lower glume $\frac{1}{3}$ – $\frac{1}{2}$ length of spikelet . . . 6. *E. crus-galli*
 Spikelets 3.5–5 mm long; lower glume $\frac{1}{2}$ – $\frac{3}{5}$ length of spikelet . . . 7. *E. inundata*

1. **Echinochloa utilis* Ohwi & Yabuno

JAPANESE MILLET

Echinochloa frumentacea Link subsp. *utilis* (Ohwi & Yabuno) Tzvelev

Annual, up to ca 1 m tall; culms erect, simple or with few branches, nodes glabrous. Leaf sheaths glabrous; ligules absent, ligule area glabrous; leaf blades linear, tapering upwards, 15–35 cm \times 0.5–2.5 cm. Panicles erect, 7–20 cm long, branches 1–5 cm long; spikelets crowded, 3–4 mm long; lower glume $\frac{1}{4}$ – $\frac{1}{3}$ length of spikelet, 5-nerved, nerves scabrid, usually scabrid-pubescent between nerves, upper glume slightly shorter than spikelets, 5-nerved, nerves scabrid, minutely scabrid-pubescent between nerves; lower floret with lemma 7-nerved, palea shorter than lemma; upper floret with lemma 2.5–3 mm long, tip withered. Caryopses brownish. **Fig. 32F.**

Native of Asia; cultivated for forage and grain, occasionally found apparently naturalized in southern parts of the region. The grain is often used in birdseed mixtures and sometimes comes up in gardens where seed may have dropped from bird cages.

2. **Echinochloa frumentacea* Link

SIBERIAN MILLET

Echinochloa crus-galli (L.) Beauv. var. *frumentacea* W. F. Wight; *E. crus-galli* var. *edulis* A. S. Hitchc.; *E. colona* (L.) Link var. *frumentacea* Ridley; *Panicum crus-galli* var. *edule* (A. S. Hitchc.) Thell. ex Bouly de Lesd.; *P. frumentaceum* auct. non Salisb., Roxb.

Annual, up to 1.5 m tall; culms erect, branching from lower nodes, nodes puberulous to glabrous. Leaf sheaths glabrous; ligules absent but sometimes ligule area puberulous; leaf blades linear, long tapering upwards, 5–30 cm \times 0.3–2 cm, glabrous, scabrous on margin. Panicles \pm erect, 6–20 cm long, branches 1–3 cm long; spikelets crowded, 2.5–3.5 mm long, occasionally bearing 2 fertile florets as well as sterile floret; lower glume $\frac{1}{3}$ – $\frac{1}{2}$ length of spikelet, 3-nerved or rarely 5-nerved, scabrid on nerves, scabrid-pubescent between nerves, upper glume slightly shorter than spikelet, 5–7-nerved, nerves hispid, scabrid-pubescent between nerves; lower floret with lemma 7-nerved, palea shorter than lemma; upper floret(s) with lemma ca 2–3 mm long, tip withered. Caryopses whitish.

Native of India; probably introduced as a crop for its grain, naturalized in the region, widespread but not common.

3. **Echinochloa crus-pavonis* (Kunth) J. A. Schultes

SOUTH AMERICAN BARNYARD GRASS

Oplismenus crus-pavonis Kunth; *Echinochloa crus-galli* (L.) Beauv. var. *crus-pavonis* (Kunth) A. S. Hitchc.

Annual, up to 1.5 m tall; culms erect or decumbent and rooting at lower nodes, branching from base, nodes glabrous. Leaf sheaths glabrous; ligules absent, ligule area glabrous or \pm ciliate-pubescent; leaf blades linear, tapering upwards, 15–40 cm \times 0.5–1.5 cm, glabrous except sometimes for few tubercular-based hairs on margin near base. Panicles \pm drooping, 6–18 cm long, primary branches up to 10 cm long, secondary branches up to 2 cm long; spikelets 2.5–3.5 mm long; lower glume ca $\frac{1}{2}$ length of spikelet, 3–5-nerved, nerves shortly spinulose, scabrid-pubescent between nerves, upper glume \pm as long as spikelet, 5-nerved, nerves spinulose, scabrid-pubescent between nerves; lower floret with lemma usually with awn 0.3–1 cm long, 7-nerved, spinulose on nerves, spinules up to 0.6 mm long, palea \pm as long as lemma; upper floret with lemma ca 2.5–3.5 mm long, cuspidate. Caryopses pale brownish. **Fig. 32G.**

Native of warmer parts of the Americas; possibly naturalized in eastern parts of the region.

4. **Echinochloa colona* (L.) Link

AWNLESS BARNYARD GRASS

Panicum colonum L.

Annual, tufted, mostly 20–60 cm tall; culms prostrate, ascending or erect, usually branched, nodes glabrous or pubescent. Leaf sheaths glabrous or pubescent just above nodes; ligules absent or minute, ligule area usually glabrous; leaf blades linear, tapering upwards, 5–30 cm \times 0.3–1 cm, glabrous. Panicles erect, 4–15 cm long, branches up to 2.5 cm long, rarely longer; spikelets usually in 4 irregular rows, ca 2.5–3 mm long; lower

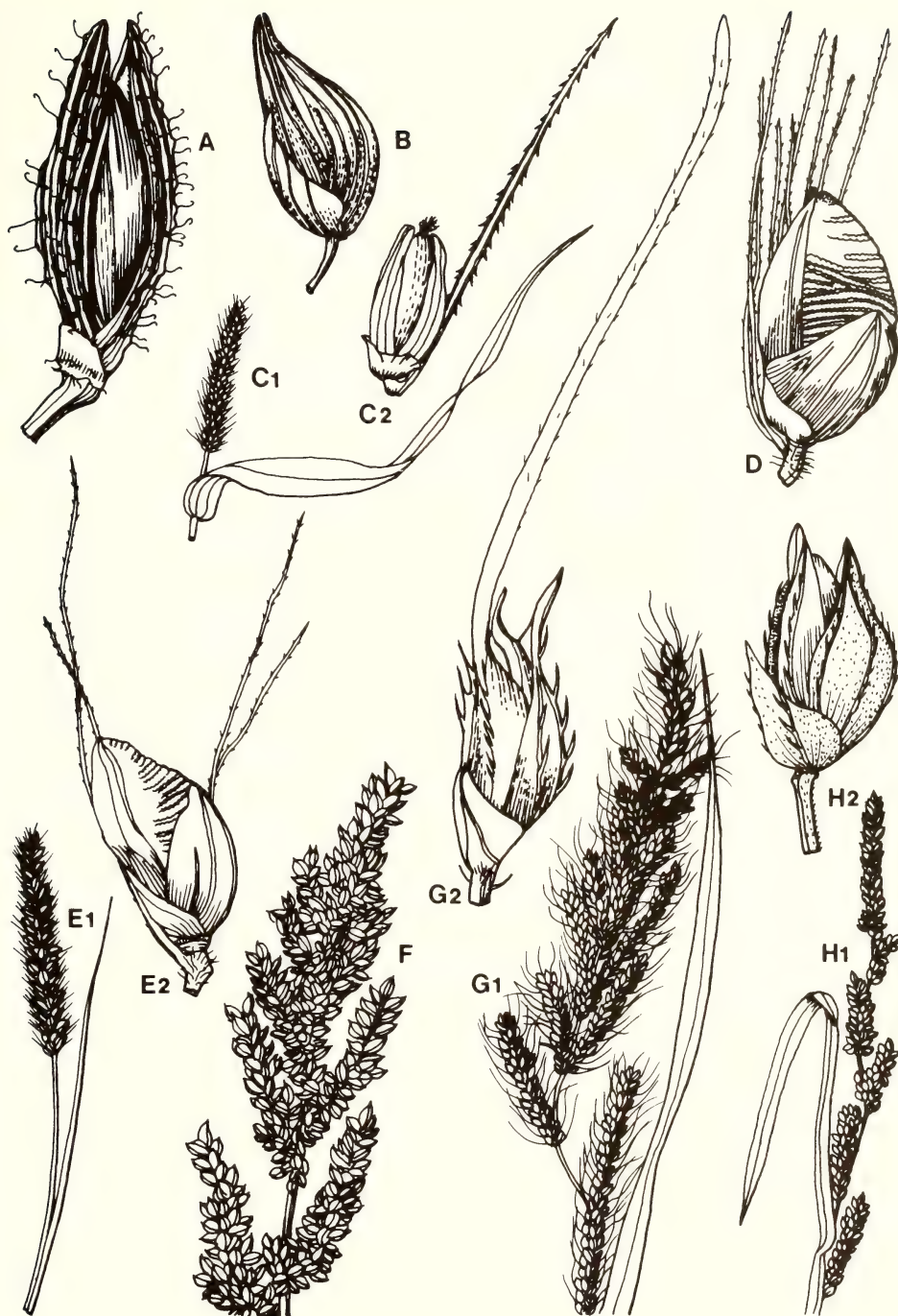


Fig. 32 POACEAE — **A** *Ancistrachne uncinulata*, spikelet x 12; **B** *Sacciolepis indica*, spikelet x 12; **C–E** *Setaria* spp. — **C**₁–**C**₂ *S. verticillata*, **C**₁ inflorescence x 1, **C**₂ spikelet with bristle showing retrorse barbs x 12; **D** *S. pumila* subsp. *pumila*, spikelet x 12; **E**₁–**E**₂ *S. gracilis*, **E**₁ inflorescence x 1, **E**₂ spikelet x 12; **F–H** *Echinochloa* spp. — **F** *E. utilis*, inflorescence x 1; **G**₁–**G**₂ *E. crus-gavonis*, **G**₁ inflorescence x 1, **G**₂ spikelet x 12; **H**₁–**H**₂ *E. colona*, **H**₁ inflorescence x 1, **H**₂ spikelet x 12.

glume $ca \frac{1}{3}$ length of spikelet, 3–5-nerved, minutely scabrid-pubescent, upper glume ca as long as spikelet, sometimes cuspidate, 5–7-nerved, nerves smooth to \pm spinulose, pubescent between nerves; lower floret with lemma 5–7-nerved, palea as long as lemma or slightly shorter; upper floret with lemma 1.5–2.5 mm long. Caryopses whitish. **Fig. 32H.**

Native of tropical Asia and of Africa; probably introduced as a pasture plant, naturalized and widespread in the region, usually on heavy soils and often in areas subject to periodic inundation. It is palatable and nutritious to stock.

5. *Echinochloa telmatophila* Michael & Vickery SWAMP BARNYARD GRASS

Annual, up to 2 m tall; culms erect or ascending, sometimes rooting from lower nodes, simple or branching from lower nodes, nodes glabrous. Leaf sheaths glabrous or rarely with few long tubercular-based hairs; ligules absent, ligule area glabrous or minutely pubescent; leaf blades linear, tapering upwards, 15–35 cm \times 0.8–1.8 cm, glabrous except sometimes for few tubercular-based hairs on margin near base. Panicles \pm erect, 20–35 cm long, branches 2–10 cm long; spikelets 2.5–4 mm long excluding awns; lower glume $\frac{1}{3}$ – $\frac{3}{5}$ length of spikelet, 3–5-nerved, scabrid-pubescent, upper glume as long as spikelet, 5-nerved, nerves spinulose, scabrid-pubescent between nerves, with scabrid awn up to 7 mm long; lower floret with lemma 7-nerved, lateral nerves spinulose, spinules 0.5–1 mm long, usually with an often purplish awn 1.5–4 cm long, palea \pm as long as lemma; upper floret with lemma 2.5–4 mm long, cuspidate. Caryopses pale yellowish to brownish.

Known from a few localities in the Burnett, Wide Bay and Moreton districts, from the edges of swamps, creeks and rivers.

6. **Echinochloa crus-galli* (L.) Beauv. BARNYARD GRASS

Panicum crus-galli L.; *Echinochloa crus-galli* subsp. *hispidula* (Retz.) Honda

Annual, tufted, up to 90 cm tall, occasionally taller; culms erect or ascending, often branching from lower nodes; nodes glabrous. Leaf sheaths glabrous or rarely appressed hairy; ligules absent, ligule area usually glabrous, occasionally minutely pubescent; leaf blades linear, tapering upward, 7–35 cm \times 0.5–2.2 cm, glabrous or with few hairs, sometimes with few tubercular-based hairs on margin near base, margin often scabrous. Panicles erect, 6–22 cm long, branches up to ca 10 cm long; spikelets 2.5–3.5 mm long; lower glume $\frac{1}{3}$ – $\frac{1}{2}$ length of spikelet, 3–5-nerved, nerves \pm spinulose, scabrid between nerves, upper glume as long as spikelet, sometimes cuspidate, 5–7-nerved, nerves with tubercular-based spinules, spinules up to ca 1 mm long, scabrid between nerves; lower floret with lemma 5–7-nerved, with short or long awn up to 5 cm long, palea slightly shorter than lemma; upper floret with lemma 2–3 mm long, palea ca as long as lemma. Caryopses pale brownish.

Native of Europe; naturalized and widespread in the region, a weed of cultivation or damp soils.

7. *Echinochloa inundata* Michael & Vickery MARSH MILLET

Annual up to ca 1.5 m tall; culms \pm erect, simple or sparsely branched, nodes glabrous. Leaf sheaths glabrous; ligules absent, ligule area glabrous; leaf blades linear, tapering upwards, 10–30 cm \times 0.6–1.2 cm, glabrous or occasionally with few long tubercular-based hairs near base. Panicles slightly nodding, 7–20 cm long, branches up to 6 cm long; spikelets 3.5–5 mm long; lower glume $\frac{1}{2}$ – $\frac{3}{5}$ length of lemma, 3–5-nerved, nerves spinulose, scabrid between nerves, upper glume \pm as long as spikelet, cuspidate or very shortly awned, 5-nerved, nerves tubercular-spinulose, spinules up to 0.6 mm long, scabrid between nerves; lower floret with lemma 5–7-nerved, spinules on nerves up to 0.6 mm long, cuspidate or with awns mostly less than 1.2 cm long, palea $ca \frac{3}{4}$ – $\frac{7}{8}$ length of lemma; upper floret with lemma ca 3.5–5 mm long. Caryopses pale brownish.

Known from the Darling Downs and Burnett districts and from western Wide Bay district, usually along watercourses.

75. PASPALIDIUM Stapf

Annuals or perennials. Ligules reduced to ciliolate rim; leaf blades flat or involute. Inflorescences panicles of racemes, rachis of racemes terminating in a bristle; spikelets

solitary, without awns, usually in 2 rows, rarely each with subtending bristle, florets 2, dissimilar, lower male or sterile, upper bisexual; glumes unequal, lower glume from less than $\frac{1}{2}$ to $\frac{2}{3}$ length spikelet, upper from $\frac{3}{4}$ to almost as long as spikelet, 5-13-nerved, rarely both glumes much reduced; lower floret with lemma similar in length to upper glume, palea well developed or small and hyaline or absent; upper floret with lemma *ca* as long as spikelet, margins involute and embracing palea, faintly 5-nerved, palea *ca* as long as lemma and similar in texture; stamens 3; styles distinct. Caryopses tightly enclosed in \pm hardened lemma and palea.

About 30 species from warm parts of the world; 23 species Australia; 12 species south-eastern Queensland.

1. Spikelets 3.5–4.5 mm long; lower florets with paleas <i>ca</i> as long as lemmas	2
Spikelets up to 3.5 mm long; lower florets with paleas small or absent	3
2. Upper glumes <i>ca</i> $\frac{3}{4}$ length of spikelets; lower glumes 5-nerved; spikelets all subtended by a bristle	1. <i>P. grandispiculatum</i>
Upper glumes <i>ca</i> as long as spikelets; lower glumes 7-nerved; spikelets not all subtended by a bristle	2. <i>P. globoideum</i>
3. Culm nodes pubescent, often also with few longer hairs; lower glumes usually scabrid-pubescent	3. <i>P. constrictum</i>
Culm nodes glabrous or rarely with few tubercular-based hairs; lower glumes glabrous and smooth	4
4. Spikelets up to 1 mm wide	4. <i>P. criniforme</i>
Spikelets more than 1 mm wide	5
5. Spikelets irregularly arranged on axis	5. <i>P. gracile</i>
Spikelets regularly arranged on axis	6
6. Spikelets 2.5 mm long or longer, rarely 2–2.5 mm long	7
Spikelets up to <i>ca</i> 2 mm long	9
7. Lower racemes often as long as or longer than internodes of main axis between them	6. <i>P. jubiflorum</i>
Lower racemes shorter than internodes of main axis between them	8
8. Upper glumes $\frac{5}{6}$ length of spikelets, 7–9-nerved; culms not rooting at lower nodes	7. <i>P. gausum</i>
Upper glumes <i>ca</i> as long as spikelets, 5–7-nerved; culms rooting at lower nodes	8. <i>P. aversum</i>
9. Leaf sheaths and blades hirsute with long fine tubular-based hairs	9. <i>P. albobillosum</i>
Leaf sheaths and blades glabrous or with only few tubular-based hairs	10
10. Leaf blades narrow and rolled, 0.2–1.5 mm wide; lower glumes not inflated	10. <i>P. caespitosum</i>
Leaf blades flat or loosely folded, 1–4 mm wide; lower glumes inflated at base	11
11. Lemmas of upper florets coarsely transversely rugose	11. <i>P. disjunctum</i>
Lemmas of upper florets finely transversely rugose	12. <i>P. distans</i>

1. *Paspalidium grandispiculatum* B. Simon

Perennial with woody rhizomes, \pm erect, up to 1.5 m tall; culms branched, nodes glabrous. Leaf sheaths glabrous; ligules ciliate, *ca* 1 mm long; leaf blades linear, flat or incurved, up to *ca* 10 cm \times 0.4 cm, glabrous, nerves minutely scabrous. Panicles up to 16 cm long, with up to *ca* 8 racemes, lower racemes up to *ca* 3 cm long, upper shorter; spikelets 3.5–4.5 mm long, with bristle 3–4 mm long arising on pedicel below glumes; lower glume *ca* $\frac{1}{2}$ length of spikelet, 5-nerved, upper glume *ca* $\frac{3}{4}$ length of spikelet, 7–8-nerved; lower floret with palea slightly shorter than lemma. **Fig. 33A.**

Known only from a small area to the north of Helidon in the Moreton district.

2. *Paspalidium globoideum* (Domin) Hughes

SHOTGRASS; SAGO GRASS

Panicum globoideum Domin

Perennial, tufted, erect, up to 70 cm tall; culms unbranched, nodes glabrous. Leaf sheaths glabrous, sometimes minutely scabrous between nerves; ligules ciliate, *ca* 0.75 mm long; leaf blades linear, flat or somewhat involute, narrowing to acuminate apex, up to 20 cm \times 0.6 cm, glabrous, upper surface minutely scabrous. Panicles 6–18 cm long, with up to 10 racemes, lower racemes 1.5–5.5 cm long, upper shorter and sometimes reduced to single spikelet; spikelets 3.5–4.5 mm long, lower glume $\frac{1}{3}$ – $\frac{1}{2}$ length of spikelet, 7-nerved, upper glume *ca* as long as spikelet, 9–13-nerved; lower floret with palea broad and as long as lemma. **Fig. 33B.**

Darling Downs district, moderately common also recorded from the Burnett district, often on heavy soils. Palatable to stock.

3. *Paspalidium constrictum* (Domin) C. E. Hubbard

KNOTTYBUTT GRASS

Panicum constrictum Domin; *Panicum flavidum* Retz. var. *tenius* Benth. as "*tenuior*" pro parte; *Paspalidium gracile* (R. Br.) Hughes var. *rugosum* Hughes

Perennial, tufted, \pm erect, 10–60 cm tall; culms branched, nodes pubescent, often also with few long hairs. Leaf sheaths scabrous or scabrous-pubescent, often also with few tubercular-based hairs; ligules a row of cilia *ca* 1.25 mm long; leaf blades linear, flat or loosely inrolled, tapering to fine point, up to 15 cm \times 0.2–0.3 cm, with few long tubercular-based hairs, upper surface and often lower surface scabrous. Panicles very narrow, up to 15 cm long, with 3–10 racemes, lower racemes up to 3 cm long, upper shorter; spikelets 2.2–3.5 mm long; lower glume *ca* $\frac{1}{2}$ – $\frac{2}{3}$ as long as spikelet, 3–5-nerved, rarely 7-nerved, upper glume $\frac{3}{4}$ to *ca* as long as spikelet, mostly 7–9-nerved; lower floret with palea small and hyaline or absent.

Widespread in the Darling Downs district, often on heavy soils but also on other soils, common, occasionally recorded elsewhere in the region.

4. *Paspalidium criniforme* S. T. Blake*Paspalidium gracile* (R. Br.) Hughes var. *debile* Vickery

Perennial, erect or ascending, up to 60 cm tall; culms rooting at lower nodes, branched, nodes glabrous. Leaf sheaths glabrous or with soft tubercular-based hairs in upper part; ligules a row of cilia *ca* 0.5 mm long; leaf blades narrowly linear, flat or involute, tapering to fine point, up to 10 cm \times 0.25 cm, often with fine tubercular-based hairs or \pm glabrous. Panicles very narrow, 3–12 cm long, with *ca* 4–6 racemes, lower racemes up to 2 cm long; upper shorter; spikelets 2–2.5 mm long; lower glume $\frac{1}{2}$ – $\frac{2}{3}$ as long as spikelet, 3–5-nerved, upper glume $\frac{3}{4}$ – $\frac{5}{6}$ length of spikelet, 5–7-nerved; lower floret with palea minute and hyaline or absent.

Widespread in the region, often in rocky places; not common.

5. *Paspalidium gracile* (R. Br.) Hughes

SLENDER PANIC

Panicum gracile R. Br.

Perennial, tufted, erect, 10–80 cm tall; culms branched, nodes glabrous or minutely pubescent. Leaf sheaths glabrous or occasionally with sparse tubercular-based hairs; ligules ciliate, *ca* 1 mm long; leaf blades narrowly linear, mostly convolute but sometimes flat, up to 14 cm \times 0.3 cm but often less than 1 mm broad when convolute, often with fine tubercular-based hairs. Panicles up to *ca* 25 cm long, with up to *ca* 10 racemes, lower racemes up to 2 cm long, upper shorter; spikelets 2–2.75 mm long; lower glume *ca* $\frac{1}{2}$ as long as spikelet, 3–5-nerved, upper glume *ca* $\frac{1}{2}$ length of spikelet, usually 5–7-nerved; lower floret with palea minute and hyaline or absent. **Fig. 33C.**

Widespread in the region, in a variety of habitats; moderately common.

6. *Paspalidium jubiflorum* (Trin.) Hughes

WARREGO GRASS

Panicum jubiflorum Trin.; *P. flavidum* Retz. var. *jubiflorum* (Trin.) Domin; *P. flavidum* var. *tenuis* Benth. as "*tenuior*" pro parte

Perennial, erect or ascending, 0.3–1.2 m tall; culms branched or unbranched, nodes glabrous. Leaf sheaths glabrous; ligules ciliate, *ca* 1 mm long; leaf blades linear, flat or folded, up to 25 cm \times 0.25–0.7 cm, rarely broader, minutely scabrous. Panicles up to *ca*

30 cm long, with up to 16 racemes, lower racemes 1–4 cm long, upper shorter; spikelets 2.5–3 mm long; lower glume $ca \frac{1}{2}$ length of spikelet, 3–5-nerved, upper glume $\frac{3}{4}$ as long as spikelet, 7–9-nerved; lower floret with palea small and hyaline or absent.

Widespread in western Moreton district and in the Darling Downs district, usually on heavy black alluvial soils.

7. *Paspalidium gausum* S. T. Blake

Paspalidium flavidum auct. non (Retz.) A. Camus, S. T. Blake

Perennial, rhizomatous, erect or somewhat decumbent, up to 70 cm tall; culms often branched, nodes glabrous. Leaf sheaths glabrous except for row of hairs on margin; ligules ciliate, ca 0.5 mm long; leaf blades linear, flat or somewhat folded, tapering to acuminate apex, up to 15 cm \times 0.2–0.4 cm, minutely scabrous on nerves of upper surface. Panicles 10–20 cm long, with up to 8 racemes, lower racemes ca 0.5–1.5 cm long, upper shorter; spikelets 2.5–2.75 mm long; lower glume $ca \frac{1}{2}$ as long as spikelet, 3–5-nerved, upper glume $ca \frac{5}{6}$ as long as spikelet, 7–9-nerved; lower floret with palea small and hyaline or absent. **Fig. 33D.**

Eastern parts of the Moreton and Wide Bay districts, usually on sandy soils, in open forests; moderately common.

8. *Paspalidium aversum* Vickery

Perennial, tufted, decumbent to \pm erect, up to ca 60 cm tall; culms rooting at lower nodes, branching, nodes glabrous. Leaf sheaths glabrous or ciliate on margin; ligules ca 1 mm long, membranous below with cilia on margin; leaf blades linear, flat or loosely inrolled, tapering to acuminate apex, mostly 10–25 cm \times 0.3–0.9 cm, glabrous or minutely scabrous. Panicles very narrow, 10–30 cm long, with 2–10 racemes, lower racemes 1–7 cm long, upper shorter; spikelets 2.5–2.75 mm long, rarely 2–2.5 mm long; lower glume less than $\frac{1}{2}$ as long as spikelet, 3–5-nerved, upper glume slightly shorter than spikelet, 5–7-nerved; lower floret with palea small and hyaline or absent. **Fig. 33E.**

Widespread in the region, usually on damp or well watered soils. It is usually considered palatable to stock.

9. *Paspalidium albobillosum* S. T. Blake

Paspalidium radiatum Vickery var. *hirsutum* Vickery

Perennial, up to ca 50 cm tall; culms \pm erect, loosely branched, nodes glabrous. Leaf sheaths hirsute with long tubercular-based hairs; ligules a dense row of cilia, ca 0.5–1 mm long; leaf blades linear, flat or slightly inrolled, shortly tapering towards apex, up to ca 15 cm \times 0.1–0.4 cm, hirsute with long tubercular-based hairs. Panicles 5–20 cm long, very narrow, with ca 6–10 racemes, lower racemes up to ca 3 cm long; upper shorter; spikelets 1.5–2 mm long; lower glume up to $ca \frac{1}{2}$ as long as spikelet, 3-, or rarely 5-nerved, upper glume ca as long as spikelet, 5–7-nerved; lower floret with palea small and hyaline or absent. **Fig. 33F.**

Widespread in the region, usually on loam or sandy-loam soils in open forest.

10. *Paspalidium caespitosum* C. E. Hubbard

BRIGALOW GRASS

Perennial, tufted, \pm erect, up to ca 45 cm tall; culms simple or branched, nodes glabrous. Leaf sheaths glabrous except sometimes for few hairs near top; ligules reduced to row of cilia, ca 0.5 mm long; leaf blades linear, loosely convolute or involute, mostly 10–15 cm \times 0.02–0.15 cm, glabrous or with few long tubercular-based hairs, sometimes \pm scabrous. Panicles very narrow, up to 16 cm long, with 7–10 racemes, lower racemes up to 2.5 cm long; upper shorter; spikelets ca 2 mm long; lower glume $ca \frac{1}{2}$ as long as spikelet, 1–3-nerved; upper glume $ca \frac{3}{4}$ as long as spikelet, 5–7-nerved; lower floret with palea minute and hyaline or absent. **Fig. 33G.**

Widespread in the region, especially in brigalow communities; common.

11. *Paspalidium disjunctum* S. T. Blake

Paspalidium breviflorum Vickery

Perennial, ascending, up to ca 40 cm tall; culms often rooting at lower nodes, branching, nodes glabrous. Leaf sheaths glabrous except for cilia on one margin and at collar; ligules

reduced to row of cilia, *ca* 0.5 mm long; leaf blades linear, flat, tapering to acuminate apex, up to *ca* 9 cm \times 0.35 cm, glabrous but scabrous on nerves. Panicles very narrow, up to *ca* 20 cm long, with 3–10 racemes, lower racemes 0.5–1.5 cm long, upper shorter; spikelets *ca* 2 mm long; lower glume mostly less than $\frac{1}{2}$ length of spikelet, 3-nerved, upper glume *ca* $\frac{7}{8}$ length of spikelet, 7–9-nerved; lower floret with palea small and hyaline or absent. **Fig. 33H.**

Widespread in the region, often on better class soils, sometimes in shady places.

12. *Paspalidium distans* (Trin.) Hughes

Panicum distans Trin.; *Paspalidium radiatum* Vickery

Perennial, ascending or \pm erect, tufted, up to *ca* 70 cm tall, rarely taller; culms unbranched, nodes glabrous. Leaf sheaths glabrous or with soft hairs in upper part, especially margin, minutely scabrous; ligules a row of cilia *ca* 0.5 mm long; leaf blades linear, flat or loosely folded, narrowing to point, 5–15 cm \times 0.1–0.4 cm, glabrous, often scabrous above. Panicles very narrow, up to 15 cm long, with 3–10 racemes, lower racemes 0.5–2 cm long, upper shorter; spikelets *ca* 2 mm long; lower glume $\frac{1}{3}$ – $\frac{1}{2}$ length of spikelet, 3–5-nerved, upper glume *ca* $\frac{3}{4}$ length of spikelet, 5-nerved; lower floret with palea minute or absent. **Fig. 33I.**

Widespread in Moreton, Darling Downs and Wide Bay districts in a variety of habitats; moderately common.

76. UROCHLOA Beauv.

Annuals or perennials. Ligules reduced to ciliate rim; leaf blades flat. Inflorescences panicles of racemes; spikelets solitary or paired, in 2 rows, often subtended by long bristle, florets 2, dissimilar, lower male or sterile, upper bisexual; glumes usually unequal, lower shorter than spikelet, upper \pm as long as spikelet, 3–11-nerved; lower floret with lemma similar in length to upper glume, palea *ca* as long as lemma and hyaline; upper floret with lemma usually shorter than spikelet, palea *ca* as long as lemma and of similar texture; stamens 3; styles distinct. Caryopses tightly enclosed by hardened lemma and palea.

About 20 species, tropical Africa and Asia; 6 species Australia; 2 species south-eastern Queensland.

- | | | | | | | |
|---|---|---|---|---|---|----------------------------|
| 1. Lower glumes $\frac{1}{4}$ – $\frac{1}{3}$ length of spikelets | . | . | . | . | . | 1. <i>U. panicoides</i> |
| Lower glumes $\frac{1}{2}$ – $\frac{3}{4}$ length of spikelets | . | . | . | . | . | 2. <i>U. mosambicensis</i> |

1. **Urochloa panicoides* Beauv.

LIVERSEED GRASS; UROCHLOA GRASS

Annual, tufted, \pm erect or semi-prostrate, up to *ca* 1 m tall; culms sometimes branched from lower nodes, few-branched, nodes pubescent. Leaf sheaths with long spreading tubercular-based hairs especially on margin; ligules ciliate, 1–1.5 mm long; leaf blades linear to narrowly ovate, apex acute to acuminate, base semi-amplexicaule, 2–20 cm \times 0.3–1.2 cm, sparsely to densely hairy on both surfaces. Panicles mostly up to *ca* 10 cm long, with 2–7 racemes, racemes 1–7 cm long; spikelets 3.5–5 mm long, subtended by bristle, glabrous; lower glume $\frac{1}{4}$ – $\frac{1}{3}$ length of spikelet, 5-nerved, upper glume \pm equal in length to spikelet, 7–9-nerved; upper floret with lemma slightly shorter than spikelet. **Fig. 33J.**

Native of eastern Africa and India; introduced and cultivated as a pasture grass, naturalized and widespread in the region. It has been suspected of poisoning dairy cows.

2. **Urochloa mosambicensis* (Hackel) Dandy

SABI GRASS

Panicum mosambicensis Hackel; *Urochloa pullulans* Stapf

Perennial, tufted, ascending or decumbent, up to *ca* 1 m tall; culms often rooting at lower nodes, sparingly branched, nodes pubescent. Leaf sheaths \pm glabrous or with sparse to dense tubercular-based hairs; ligules 1.5–2 mm long; leaf blades broadly linear to narrowly ovate, apex tapering, base semi-amplexicaule, 3–20(–30) cm \times 0.3–2 cm, both surfaces with sparse to dense tubercular-based hairs. Panicles up to *ca* 12 cm long, with 3–15 racemes, racemes 2–7 cm long; spikelets 3–5 mm long, subtended by bristle; lower



Fig. 33 POACEAE — A–I *Paspalidium* spp. — A₁–A₂ *P. grandispiculatum*, A₁ inflorescence x 1, A₂ spikelet x 12; B–I spikelets, all x 12; B *P. globoideum*; C *P. gracile*; D *P. gausum*; E *P. aversum*; F *P. albobillosum*; G *P. caespitosum*; H *P. disjunctum*; I *P. distans*; J–L *Urochloa* spp. — spikelets, all x 12; J *U. panicoides*; K–L *U. mosambicensis*.

glume $\frac{1}{2}$ – $\frac{3}{4}$ length of spikelet, 3-nerved, glabrous or with tuft of hairs at base, upper glume \pm equal in length to spikelet, 5–9-nerved, glabrous or pubescent; upper floret with lemma slightly shorter than spikelet. **Fig. 33K, 33L**

Native of eastern Africa and Burma; introduced and cultivated as a pasture plant, naturalized but not common in the region.

77. STENOTAPHRUM Trin.

Creeping perennials or annuals. Ligules reduced to line of hairs; leaf blades flat. Inflorescences spike-like panicles of racemes \pm embedded in thickened central axis; spikelets solitary, florets 2, lower male or sterile, upper bisexual; lower glume much shorter than spikelet, membranous, upper glume resembling lower or \pm as long as spikelet, 5–7-nerved; lower floret with lemma as long as spikelet, 3–7-nerved, palea *ca* as long as lemma or absent; upper floret with lemma shorter than spikelet, margin inrolled and clasping palea, 3–5-nerved, palea \pm as long as lemma and similar in texture; stamens 3; styles distinct.

7 species, tropical and subtropical coasts of Africa, Asia and eastern America; 1 species cultivated in Australia as a lawn grass, escaped from cultivation in a few places in south-eastern Queensland.

1. **Stenotaphrum secundatum* (Walter) Kuntze

BUFFALO GRASS

Ischaemum secundatum Walter; *Stenotaphrum americanum* Schrank; *S. dimidiatum* auct. non (L.) Brongn.

Perennial, stoloniferous, decumbent or prostrate; culms compressed, rooting from nodes, branched, nodes glabrous. Leaf sheaths compressed, glabrous or ciliate on upper margin; ligules *ca* 0.5 mm long; blades linear, folded or flat, mostly 2–10 cm \times 0.4–0.9 cm, glabrous, scabrous on margin towards apex. Panicles terminal and often 1 or 2 lateral from upper leaves, mostly 2–8 cm long, main axis 3–7 mm wide, racemes mostly with 2–3 spikelets or sometimes reduced to single spikelet, rachis of raceme terminating in point; spikelets *ca* 5 mm long; lower glume $\frac{1}{10}$ – $\frac{2}{5}$ length of spikelet, upper glume *ca* as long as spikelet. **Fig. 34A.**

Native of tropical and subtropical eastern America and Africa; probably introduced as a lawn grass and escaped from cultivation in a few places in eastern parts of the region. The species was once widely cultivated as a lawn grass in south-eastern Queensland but has now lost favour to other species.

Australian material is apparently a sterile triploid clone propagated from rooted portions of the stolons.

78. OPLISMENUS Beauv.

Perennials or annuals, trailing or scrambling. Ligules ciliate; leaf blades flat, often minutely cross-veined. Inflorescences panicles of racemes; spikelets paired, florets 2, lower sterile, rarely male, upper bisexual; glumes subequal, shorter than spikelet, both or at least lower awned, 3–7-nerved; lower floret with lemma often as long as spikelet, mucronate or shortly awned, palea present or absent; upper floret with lemma as long as spikelet, margin embracing palea, palea equalling lemma or shorter; stamens 3; styles distinct.

About 15 species, tropical and subtropical parts of the world; 5 species Australia; 3 species south-eastern Queensland.

- | | | |
|---|---|---|
| 1. Most leaves less than 7 times as long as broad | 1. <i>O. aemulus</i> | 2 |
| Most leaves 10 or more times as long as broad | | |
| 2. Racemes reduced to clusters; leaves densely softly hairy; lemma of lower floret with awn up to 1 mm long | 2. <i>O. undulatifolius</i> var. <i>mollis</i> | |
| Racemes elongate or only upper ones reduced; leaves sparsely hairy; lemma of lower floret not awned | 3. <i>O. hirtellus</i> subsp. <i>imbecillus</i> | |

1. *Oplismenus aemulus* (R. Br.) Roemer & Schultes

Orthopogon aemulus R. Br.; *Oplismenus setarius* (Lam.) Roemer & Schultes var. *aemulus* (R. Br.) F. M. Bailey; *Oplismenus aemulus* var. *lasiorhachis* Domin; *Oplismenus aemulus* var. *flaccidus* (R. Br.) Domin; *Oplismenus aemulus* var. *pilosus* Domin

Perennial, trailing, with decumbent stems rooting at nodes and ascending culms up to ca 30 cm long, nodes pubescent. Leaf sheaths sparsely densely hairy with fine tubercular-based hairs and densely ciliate along one margin and upper part of other; leaf blades mostly narrowly ovate, flat, apex acute to acuminate, base rounded, margin undulate, 1.5–8 cm × 0.4–1.8 cm, both surfaces with sparse tubercular-based hairs. Panicles on long peduncles, raceme-bearing part up to ca 6 cm long, racemes few, lower ones 1–3 cm long, upper ones reduced to clusters of spikelets or rarely all racemes reduced, rachis glabrous to densely hairy, especially at nodes; spikelets 2.5–3.5 mm long; glumes up to ca $\frac{3}{4}$ length of spikelet, lower glume 5-nerved, sparsely to densely hairy, with awn up to 9 mm long, upper glume 7-nerved, sparsely to densely hairy, with awn minute or up to ca 1 mm long; lower floret with lemma as long as spikelet, with few–many fine hairs, unawned or with minute awn, palea ca $\frac{2}{3}$ length of lemma, hyaline; upper floret with palea ca $\frac{1}{2}$ length of lemma. **Fig. 34C.**

Widespread and common in the region, often in shady places.

2. *Oplismenus undulatifolius* (Ard.) Roemer & Schultes var. *mollis* Domin

Perennial, trailing, with decumbent stems rooting at nodes and ascending culms up to 30 cm long. Leaf sheaths densely softly hairy; leaf blades very narrowly ovate, flat, apex acuminate, base rounded, margin scarcely undulate, 1–9 cm × 0.2–1 cm, densely softly hairy. Panicles on long peduncles, fertile part up to 10 cm long, racemes all reduced to clusters of spikelets, spikelets and their awns divergently spreading; spikelets 2.5–4 mm long; glumes up to ca $\frac{5}{6}$ length of spikelet, lower glume 5–7-nerved, sparsely to moderately densely softly hairy, with awn up to ca 1.3 cm long, upper glume sparsely to moderately densely softly hairy, with awn up to ca 4 mm long; lower floret with palea as long as spikelet, softly hairy, with awn up to 1 mm long, palea slightly shorter than lemma; upper floret with palea shorter than lemma. **Fig. 34D.**

Moreton and Wide Bay districts in shaded places around the edges of rainforest; moderately common.

3. *Oplismenus hirtellus* (L.) Beauv. subsp. *imbecillis* (R. Br.) U. Scholz

Orthopogon imbecillis R. Br.; *Oplismenus imbecillis* (R. Br.) Roemer & Schultes; *Oplismenus setarius* Roemer & Schultes var. *imbecillis* (R. Br.) Benth. ex. Hackel; *Oplismenus undulatifolius* (Ard.) Beauv. var. *imbecillis* (R. Br.) Hackel

Perennial, trailing, with decumbent stems rooting at nodes and ascending culms up to 30 cm long, nodes finely pubescent. Leaf sheaths with sparse tubercular-based hairs or hairs absent, one margin densely ciliate, upper part of other margin densely ciliate; leaf blades very narrowly ovate, flat, apex acuminate, base rounded, margin scarcely undulate, 1–8 cm × 0.4–0.8(–1) cm, with sparse tubercular-based hairs or ± glabrous. Panicles on long peduncles, raceme-bearing part up to 6 cm long, racemes few, lower ones up to 1.5 cm long, upper ones often reduced to clusters of spikes, rachis often with long fine hairs; spikelets 2–3 mm long; glumes up to ca $\frac{3}{4}$ length of spikelet, lower glume 5-nerved, sparsely hairy, with awn up to 8 mm long, upper glume 5–7-nerved, sparsely hairy, unawned or minutely awned; lower floret with lemma as long as spikelet, sparsely hairy, not awned, palea shorter than lemma or sometimes absent; upper floret with palea ca $\frac{1}{2}$ length of lemma. **Fig. 34B.**

Widespread and common in the Moreton district, also recorded from the Darling Downs and Wide Bay districts, usually in shady places.

79. PSEUDORAPHIS Griff.

Perennial aquatic or marsh grasses; stems creeping or floating. Leaf sheaths flattened; ligules membranous or ciliate; leaf blades flat or folded. Inflorescences panicles, sometimes raceme-like, peduncles compressed, rachis of racemes terminating in long

bristle; spikelets solitary, florets 2, lower male or sterile, upper bisexual or female; glumes very unequal, lower glume small, nerveless, upper glume longer than lemmas, 5-many-nerved, often awned; lower floret with lemma slightly shorter than upper glume, many-nerved, palea up to *ca* as long as lemma; upper floret with lemma much shorter than lemma of lower floret, palea hyaline; stamens 3; styles distinct.

About 5 species, southern Asia to Australia; 2 species Australia, both occurring in south-eastern Queensland.

- | | |
|--|-------------------------|
| 1. Inflorescences with elongate branches with several spikelets per branch;
upper lemma <i>ca</i> 1.5 mm long | 1. <i>P. spinescens</i> |
| Inflorescences with short branches with 1 or 2 spikelets per branch;
upper lemma <i>ca</i> 3 mm long | 2. <i>P. paradoxa</i> |

1. *Pseudoraphis spinescens* (R. Br.) Vickery

SPINY MUDGRASS

Panicum spinescens R. Br.; *Chamaeraphis spinescens* (R. Br.) Poiret; *C. spinescens* var. *parvispicula* Benth.; *Pseudoraphis aspera* (Koenig) Pilger; *Pseudoraphis abortiva* auct. non (R. Br.) Pilger

Stoloniferous, when growing in mud creeping with \pm erect flowering culms, when growing in water forming large floating masses with \pm erect flowering culms, nodes pubescent. Leaf sheaths glabrous or rarely with some hairs, minutely scabrous, upper margin continuing above insertion of blade into membranous teeth; ligules hyaline, ciliate above, mostly 1.5–2.5 mm long; leaf blades often folded, apex narrowing to acuminate tip, base contracted, up to *ca* 12 cm \times 0.7 cm, those on flowering culms larger than those on non-flowering stems, glabrous or sometimes with some hairs on leaves of non-flowering stems. Panicles up to *ca* 12 cm long, branches numerous, slender, produced beyond last spikelet into bristle up to 2.5 cm long; spikelets variable on one plant, mostly 3.5–5 mm long; lower glume 0.5–0.8 mm long, upper glume as long as spikelet, scabrous on nerves, apex continuing into awn up to *ca* 3 mm long; lower floret male, lemma with short awn-like point, palea hyaline, slightly shorter than lemma; upper floret with lemma *ca* 1.5 mm long, palea as long as lemma. **Fig. 34E.**

Widespread in the region in shallow water or on mud beside creeks, rivers etc; common.

2. *Pseudoraphis paradoxa* (R. Br.) Pilger

SLENDER MUDGRASS

Panicum paradoxum R. Br.; *Chamaeraphis paradoxa* (R. Br.) Poiret

Stoloniferous, \pm turf-like when growing on mud, flowering culms \pm erect when growing in shallow water, up to *ca* 40 cm tall, nodes glabrous or with few hairs. Leaf sheaths glabrous or rarely with few minute hairs, smooth to minutely scabrous, upper margin \pm continuous with ligule; ligules hyaline, fringed above, *ca* 1–1.5 mm long; blades linear to narrowly ovate, flat, apex acute, base much contracted, 1–7 cm \times 0.2–0.5 cm, glabrous, sometimes with few tubercular-based hairs, smooth or both surfaces minutely scabrous to scabrous-hirsute. Panicles up to *ca* 8 cm long, raceme-like, branches bearing solitary spikelet or sometimes lowest branches with 2 spikelets, all branches terminating in scabrous bristle up to 2 cm long; spikelets 5–9 mm long; lower glume *ca* 0.8–1.5 mm long, upper glume as long as spikelet, tapering to fine point; lower floret male, lemma tapered to point, palea hyaline, slightly shorter than lemma; upper floret with lemma *ca* 3 mm long, palea \pm as long as lemma. **Fig. 34F.**

Widespread in eastern parts of the Moreton and Wide Bay districts, on margins of rivers, swamps etc.

80. BRACHIARIA Griseb.

Annuals or perennials, tufted or stoloniferous. Ligules ciliate; leaf blades usually flat. Inflorescences panicles of spike-like racemes; spikelets with 2 florets, lower floret male or sterile, upper bisexual; glumes dissimilar, lower glume shorter than upper, 3–11-nerved, upper glume \pm as long as spikelet, 5–9-nerved; lower floret with lemma \pm as long as spikelet, 5–7-nerved, palea slightly shorter than lemma or absent; upper floret with lemma shorter than spikelet, palea as long as lemma; stamens 3; styles distinct.

About 70 species, tropical and subtropical regions of the world; *ca* 25 species Australia, *ca* 7 naturalized; 11 species south-eastern Queensland.



Fig. 34 POACEAE — **A** *Stenotaphrum secundatum*, upper part of stem with inflorescences x 1; **B–D** *Oplismenus* spp. — **B** *O. hirtellus* var. *imbecillus*, inflorescence x 1; **C** *O. aemulus*, spikelet x 8; **D1–D2** *O. undulatifolius* var. *mollis*, **D1** inflorescence x 1, **D2** spikelet x 8; **E–F** *Pseudoraphis* spp. — **E** *P. spinescens*, spikelet x 8; **F** *P. paradoxa*, spikelet x 8.

- | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------------------|
| 1. Spikelets less than 3 mm long | . | . | . | . | . | . | . | . | . | . | . | . | 2 |
| Spikelets 3 mm or more long | . | . | . | . | . | . | . | . | . | . | . | . | 3 |
| 2. Spikelets glabrous; lower glume not scale-like | . | . | . | . | . | . | . | . | . | . | . | . | 1. <i>B. fasciculata</i> |
| Spikelets pubescent; lower glume scale-like | . | . | . | . | . | . | . | . | . | . | . | . | 2. <i>B. eruciformis</i> |
| 3. Spikelets 5–6.5 mm long, with lower glumes <i>ca</i> $\frac{1}{2}$ – $\frac{2}{3}$ length of spikelet | . | . | . | . | . | . | . | . | . | . | . | . | 4 |
| Spikelets less than 5 mm long or if spikelets 5–6 mm long then lower glume $\frac{1}{8}$ – $\frac{1}{3}$ length of spikelet | . | . | . | . | . | . | . | . | . | . | . | . | 5 |
| 4. Pedicels of spikelets with long stiff hairs towards apex | . | . | . | . | . | . | . | . | . | . | . | . | 3. <i>B. texana</i> |
| Pedicels of spikelets without long stiff hairs towards apex | . | . | . | . | . | . | . | . | . | . | . | . | 4. <i>B. foliosa</i> |
| 5. Lower glumes $\frac{1}{8}$ – $\frac{1}{6}$ length of spikelet | . | . | . | . | . | . | . | . | . | . | . | . | 5. <i>B. gilesii</i> |
| Lower glumes more than $\frac{1}{6}$ length of spikelet | . | . | . | . | . | . | . | . | . | . | . | . | 6 |
| 6. Spikelets glabrous or with few hairs | . | . | . | . | . | . | . | . | . | . | . | . | 7 |
| Spikelets pubescent except sometimes lower glume glabrous | . | . | . | . | . | . | . | . | . | . | . | . | 9 |
| 7. Spikelets mostly arranged in a single row in racemes | . | . | . | . | . | . | . | . | . | . | . | . | 6. <i>B. brizantha</i> |
| Spikelets not arranged in a single row in racemes | . | . | . | . | . | . | . | . | . | . | . | . | 8 |
| 8. Stoloniferous perennials up to 2 m tall; nodes densely hairy | . | . | . | . | . | . | . | . | . | . | . | . | 7. <i>B. mutica</i> |
| Non-stoloniferous annuals up to <i>ca</i> 0.5 m tall; nodes glabrous | . | . | . | . | . | . | . | . | . | . | . | . | 8. <i>B. subquadripara</i> |
| 9. Perennials up to 1.5 m tall; rachis of racemes usually with long hairs; leaves mostly 0.7–1.5 cm wide | . | . | . | . | . | . | . | . | . | . | . | . | 9. <i>B. decumbens</i> |
| Annuals up to <i>ca</i> 60 cm tall; rachis glabrous but sometimes minutely scabrous on margin; leaves 0.3–0.6 cm wide | . | . | . | . | . | . | . | . | . | . | . | . | 10 |
| 10. Hairs of spikelets increasing in length towards apex | . | . | . | . | . | . | . | . | . | . | . | . | 10. <i>B. piligera</i> |
| Hairs of spikelets not increasing in length towards apex | . | . | . | . | . | . | . | . | . | . | . | . | 11. <i>B. whiteana</i> |

1. **Brachiaria fasciculata* (Swartz) Parodi var. *reticulata* (Torrey) Vickery

Panicum reticulatum Torrey; *P. fasciculatum* Swartz var. *reticulatum* (Torrey) Beal; *Urochloa fasciculata* (Swartz) R. Webster var. *reticulata* (Torrey) R. Webster

Tufted annual, ascending, up to 50 cm tall; culms rooting at lower nodes, often branched, nodes pubescent. Leaf sheaths glabrous or with tubercular-based hairs; ligules up to 1 mm long; leaf blades linear to broadly linear, apex tapering, base contracted, 4–30 cm \times 0.4–2 cm, glabrous or with long soft tubercular-based hairs. Raceme-bearing portion of inflorescences 5–15 cm long, racemes 3–10, mostly 1–5 cm long, rachis scabrous and often with few long hairs; spikelets loosely arranged, 2.1–3 mm long, glabrous; lower glume *ca* $\frac{1}{4}$ – $\frac{1}{2}$ length of spikelet.

Native of the southern United States of America and Mexico; probably introduced as a pasture grass, apparently naturalized in the Darling Downs district.

2. **Brachiaria eruciformis* (Smith) Griseb.

Panicum eruciforme Smith

Loosely tufted annual, ascending, up to *ca* 60 cm tall; culms rooting from lower nodes, branched, nodes pubescent. Leaf sheaths glabrous or with long soft tubercular-based hairs; ligules tuft of hairs *ca* 1 mm long; leaf blades linear to narrowly ovate, apex tapering, base contracted, 1.5–10 cm \times 0.2–0.6 cm, glabrous or with long soft tubercular-based hairs, margin minutely scabrous. Raceme-bearing part of inflorescences 1–8 cm long, racemes 3–14, 1–3 cm long, rachis scabrous or with short hairs; spikelets tightly arranged in raceme, 1.5–2.5 mm long, pubescent; lower glume scale-like, up to $\frac{1}{6}$ length of spikelet. **Fig. 35A.**

Native of Africa and the Mediterranean region to India; introduced as a pasture grass, now naturalized and widespread in the region, usually on heavy soils.

3. **Brachiaria texana* (Buckley) S. T. Blake

TEXAS MILLET

Panicum texanum Buckley; *Urochloa texana* (Buckley) R. Webster

Annual, erect or ascending, up to *ca* 1.5 m tall, occasionally taller; culms often rooting at lower nodes, nodes pubescent. Leaf sheaths with sparse to dense tubercular-based hairs,

upper margin densely hairy; ligules *ca* 1–1.5 mm long; leaf blades linear-ovate, apex attenuate, base rounded, 8–20 cm \times 0.5–1.8 cm, pubescent, often sprinkled with longer tubercular-based hairs, minutely scabrous on margin. Raceme-bearing part of inflorescences up to *ca* 20 cm long, racemes up to *ca* 12, up to *ca* 6 cm long, rachis pubescent; spikelets 5–6 mm long, glabrous or sparsely hairy; lower glume *ca* $\frac{2}{3}$ length of spikelet. **Fig. 35B.**

Native of the southern United States of America and northern Mexico; apparently introduced as a pasture grass, reported as being naturalized in the Moreton district, but rarely collected.

4. *Brachiaria foliosa* (R. Br.) Hughes

LEAFY PANIC

Panicum foliosum R. Br.; *Urochloa foliosa* (R. Br.) R. Webster

Tufted perennial, ascending, up to 70 cm tall; culms branched, nodes densely hairy. Leaf sheaths with sparse to dense tubercular-based hairs; ligules less than 1 mm long; leaf blades broadly linear to narrowly ovate, apex long tapering, base rounded, 4–15 cm \times 0.4–1.8 cm, with sparse to dense soft tubercular-based hairs. Raceme-bearing portion of inflorescences up to *ca* 20 cm long, racemes 2–10, 1–9 cm long, rachis hairy; spikelets loosely arranged, 5–6.5 mm long, \pm pubescent; lower glume *ca* $\frac{1}{2}$ as long as spikelet. **Fig. 35C.**

Widespread in the Moreton, Darling Downs and Burnett districts. Apparently palatable to stock.

5. *Brachiaria gilesii* (Benth.) Chase

Panicum gilesii Benth.; *Urochloa gilesii* (Benth.) Hughes

Loosely tufted annual, \pm erect, up to *ca* 40 cm tall; culms branched, nodes with dense soft hairs. Leaf sheaths with sparse to dense, long tubercular-based hairs; ligules less than 1 mm long; leaf blades narrowly ovate, apex acuminate, base rounded, 2–6 cm \times 0.3–1 cm, \pm glabrous or with sparse tubercular-based hairs. Panicles often 2 together at ends of branches, one usually exerted on long peduncle, other scarcely fully exerted from upper leaf sheath, raceme-bearing part of inflorescence up to *ca* 5 cm long, racemes 3–5, 1.5–2.5 cm long, rachis scabrous on margin otherwise glabrous; spikelets tightly arranged, 4–5 mm long, sparsely hairy; lower glume *ca* $\frac{1}{8}$ – $\frac{1}{6}$ as long as spikelet. **Fig. 35D.**

Known from the western Darling Downs district.

6. **Brachiaria brizantha* (Hochst. ex A. Rich.) Stapf

Panicum brizanthum Hochst. ex A. Rich.; *Urochloa brizantha* (A. Rich.) R. Webster

Tufted perennial, \pm erect, up to *ca* 1.5 m tall; culms sometimes branched near base, nodes glabrous or with long fine hairs. Leaf sheaths glabrous or with sparse long tubercular-based hairs, usually with some hairs at junction with blades; ligules *ca* 0.5–1 mm long; leaf blades linear to broadly linear, apex tapering, base contracted, mostly 10–50 cm \times 0.5–2 cm, glabrous or with sparse tubercular-based hairs, often scabrous on margin. Raceme-bearing part of inflorescences up to *ca* 20 cm long, racemes 2–16, 3–20 cm long, rachis usually with long hairs; spikelets usually forming single row, 4–6 mm long, glabrous or with few hairs; lower glume *ca* $\frac{1}{3}$ length of spikelet. **Fig. 35E.**

Native of tropical and southern Africa; introduced as a pasture grass, known to be naturalized in the Moreton district.

7. **Brachiaria mutica* (Forssk.) Stapf

PARA GRASS

Panicum muticum Forssk.; *Brachiaria purpurascens* (Raddi) Henrard; *Urochloa mutica* (Forssk.) Nguyen

Stoloniferous perennial, ascending, up to 2 m or more tall; culms rooting at lower nodes, simple or with few branches, nodes densely hairy. Leaf sheaths with sparse to dense tubercular-based hairs; ligules *ca* 1.5 mm long; leaf blades linear-ovate, apex long attenuate, base rounded, 15–30 cm \times 0.6–2 cm, glabrous to \pm hirsute. Raceme-bearing part of inflorescences up to *ca* 20 cm long, racemes 5–20, 2–10 cm long, rachis scabrous on margin and often with few long soft hairs, secondary branches of racemes with 3–6 spikelets; spikelets 3–3.5 mm long, glabrous; lower glume *ca* $\frac{1}{3}$ – $\frac{1}{2}$ as long as spikelet. **Fig. 35F.**

A pantropical species; introduced as a pasture grass and now widely naturalized in the Moreton and Wide Bay districts, usually in damp situations.

8. *Brachiaria subquadrifera* (Trin.) A. S. Hitchc.

Panicum subquadriferrum Trin.; *Brachiaria miliiformis* (Presl & C. Presl) Chase; *Urochloa subquadrifera* (Trin.) R. Webster

Annual, ascending, up to 50 cm tall; culms sometimes rooting at lower nodes, branched in lower part, nodes glabrous. Leaf sheaths \pm glabrous or with few short hairs; ligules *ca* 1 mm long; leaf blades linear, apex attenuate, base rounded, 2–20 cm \times 0.3–1 cm, glabrous or with few short hairs. Raceme-bearing part of inflorescences 3–10 cm long, racemes 3–5, 2–6 cm long, rachis glabrous but minutely scabrous on margin; spikelets 3–4 mm long, glabrous; lower glume $\frac{1}{3}$ – $\frac{1}{2}$ length of spikelet. **Fig. 35G.**

Widespread in the region, often in disturbed sites; common.

9. **Brachiaria decumbens* Stapf**SIGNAL GRASS**

Urochloa decumbens (Stapf) R. Webster

Stoloniferous perennial, decumbent, up to 1.5 m tall; culms rooting at lower nodes, usually unbranched, nodes glabrous or pubescent. Leaf sheaths glabrous or with long soft hairs; ligules *ca* 0.5 mm long; leaf blades broadly linear, apex tapering, base contracted, mostly 7–15 cm \times 0.7–1.5 cm, glabrous or with long soft tubercular-based hairs, usually minutely scabrous on margin. Raceme-bearing part of inflorescences up to 8 cm long, racemes 2–7, 1–8 cm long, rachis usually with long hairs; spikelets usually in 2 rows, 4–5 mm long, usually pubescent; lower glume $\frac{1}{3}$ – $\frac{1}{2}$ length of spikelet. **Fig. 35H.**

Native of tropical eastern Africa; introduced as a pasture grass, naturalized in eastern parts of the region.

10. *Brachiaria piligera* (F. Muell. ex Benth.) Hughes**HAIRY ARMGRASS**

Panicum piligerum F. Muell. ex Benth.; *P. intercedens* Domin; *Brachiaria piligera* var. *intercedens* (Domin) Hughes; *B. notochthona* Vickery; *Urochloa piligera* (F. Muell. ex Benth.) R. Webster

Tufted annual, \pm erect, up to 60 cm tall; culms branched, nodes \pm glabrous. Leaf sheaths glabrous or with sparse to dense tubercular-based hairs; ligules less than 1 mm long; leaf blades linear to linear-ovate, apex long attenuate, base rounded, 5–15 cm \times 0.3–0.6 cm, glabrous or with sparse to dense tubercular-based hairs. Panicles 1–3 together from upper leaf sheath, each at length exerted, raceme-bearing portion of inflorescences up to *ca* 10 cm long, racemes 3–5, 2–4 cm long, rachis glabrous, smooth or minutely scabrous on margin; spikelets close together and in 2 rows or more distant and in 1 row, 4–4.5 mm long, pubescent except lower glume; lower glume *ca* $\frac{1}{2}$ as long as spikelet. **Fig. 35J.**

Widespread throughout the region. Palatable to stock.

11. *Brachiaria whiteana* (Domin) C. E. Hubbard

Panicum whiteanum Domin; *Urochloa whiteana* (Domin) R. Webster

Tufted annual, \pm erect, up to *ca* 60 cm tall; culms unbranched, nodes glabrous. Leaf sheaths glabrous or with sparse tubercular-based hairs; ligules *ca* 1 mm long; leaf blades linear, apex attenuate, base contracted, 2–12 cm \times 0.2–0.55 cm, both surfaces with sparse to moderately dense tubercular-based hairs. Raceme-bearing portion of inflorescences up to *ca* 10 cm long, racemes 2–5, 1.5–4 cm long, rachis glabrous but minutely scabrous on margin; spikelets 3–4 mm long, pubescent except lower glume; lower glume $\frac{1}{3}$ – $\frac{1}{2}$ length of spikelet. **Fig. 35I.**

Widespread and moderately common in the region, often in open eucalypt communities.

81. PASPALUM L.

Annuals or perennials, tufted or rhizomatous. Ligules membranous; leaf blades flat. Inflorescences solitary racemes or a pair of racemes or several spike-like racemes on common axis; spikelets solitary or paired, in 2 rows on one side of raceme rachis, sometimes appearing as if in 4 rows when spikelets paired, florets 2, dissimilar, lower sterile and reduced to lemma, upper bisexual; lower glume absent or present as minute scale, upper glume as long as spikelet, 3–5-nerved; lower floret with lemma *ca* as long as



Fig. 35 POACEAE — A–J *Brachiaria* spp. — A *B. eruciformis*, spikelet x 12; B *B. texana*, spikelet x 8; C₁–C₂ *B. foliosa*, C₁ inflorescence x $\frac{2}{3}$, C₂ spikelet x 8; D *B. gilesii*, spikelet x 8; E₁–E₂ *B. brizantha*, E₁ part of inflorescence x $\frac{2}{3}$, E₂ spikelet x 8; F *B. mutica*, spikelet x 8; G *B. subquadriflora*, spikelet x 8; H₁–H₂ *B. decumbens*, H₁ inflorescence x 1, H₂ spikelet x 8; I *B. whiteana*, spikelet x 8; J *B. piligera*, spikelet x 8; K₁–K₂ *Axonopus compressus*, K₁ stem with inflorescence x $\frac{1}{2}$, K₂ part of inflorescence x 3.

spikelet; upper floret with lemma stiffened, inrolled and embracing palea, palea \pm equal in length to lemma; stamens 3; styles distinct.

About 200 species, warmer regions of the world, mostly American; *ca* 15 species Australia; 12 species south-eastern Queensland.

1. Inflorescences of 2 racemes, both arising at summit of culm, rarely with a third raceme below		2
Inflorescences usually of more than 3 racemes scattered along culm, if only 2 racemes then both not arising at apex of culm		5
2. Spikelets 1.5–2 mm long	1. <i>P. conjugatum</i>	
Spikelets 2.5–4.5 mm long		3
3. Upper glumes minutely pubescent; plants of fresh water habitats	2. <i>P. distichum</i>	
Upper glumes glabrous or with hairs on margin only; plants of littoral, saline or dry land habitats		4
4. Leaves 0.75–3 mm wide; plants stoloniferous; plants of littoral or saline habitats	3. <i>P. vaginatum</i>	
Leaves 3–6 mm wide; plants not stoloniferous; plants of dry land habitats	4. <i>P. notatum</i>	
5. Each rachis of racemes of inflorescences less than 1.5 mm wide		6
Each rachis of racemes of inflorescences 1.5 mm or more wide		11
6. Spikelets less than 2 mm long	5. <i>P. paniculatum</i>	
Spikelets 2 mm or more long		7
7. Spikelets glabrous or minutely hairy, shiny and brown	6. <i>P. plicatulum</i>	
Spikelets pilose or pubescent or fringed with long hairs, not shiny and brown		8
8. Spikelets with marginal fringe of long silky hairs		9
Spikelets without marginal fringe of long silky hairs		10
9. Each rachis of racemes 1–1.3 mm wide; spikelets 2.8–4 mm long; racemes 2–11, but usually 3–7 per panicle	7. <i>P. dilatatum</i>	
Each rachis of racemes <i>ca</i> 0.8 mm wide; spikelets 2–3 mm long; racemes 6–30, but usually 10–20 per panicle	8. <i>P. urvillei</i>	
10. Spikelets 3–4 mm long	9. <i>P. exaltatum</i>	
Spikelets 2–2.6 mm long	10. <i>P. quadrifarium</i>	
11. Spikelets solitary, borne in 2 rows along rachis	11. <i>P. scrobiculatum</i>	
Spikelets paired, borne as if in 4 rows along rachis, sometimes rows irregular	12. <i>P. longifolium</i>	

1. **Paspalum conjugatum* Bergius

SOURGRASS

Creeping perennial with long leafy stolons rooting at nodes, forming mats, erect or ascending, up to *ca* 1 m tall; culms unbranched or sparingly branched, nodes glabrous or pubescent. Leaf sheaths glabrous except on margin and at junction with blade; ligules *ca* 1–1.5 mm long; leaf blades linear or narrowly ovate, apex long attenuate, base \pm rounded, 4–22 cm \times 0.4–1.3 cm, glabrous or sparsely hairy, minutely scabrous on margin. Panicles with usually 2 racemes arising at summit of culm, rarely a third below, racemes 4–15 cm long, rachis 0.5–1 mm wide; spikelets solitary, 1.5–2 mm long; lower glume absent, upper glume as long as spikelet, *ca* 3-nerved, glabrous or with fine white hairs on margin; lower floret with lemma as long as spikelet, flat on back; upper floret usually slightly shorter than spikelet.

Probably native of tropical America, but now widespread in the tropics; naturalized and widespread in the Moreton and Wide Bay districts. Usually considered of little value as fodder.

2. *Paspalum distichum* L.

WATER COUCH

Paspalum paspalodes (Michaux) Scribner

Creeping perennial, rhizomatous, stoloniferous, erect or ascending, up to *ca* 50 cm tall;

culms unbranched, nodes glabrous or with few hairs. Leaf sheaths glabrous except on margin towards summit; ligules *ca* 0.5 mm long; leaf blades linear, apex acute-acuminate, base slightly contracted, 3–15 cm \times 0.2–0.7 cm, glabrous or with minute hairs above. Panicles often partially enclosed in upper sheath, with 2 racemes arising at apex of culm, rarely with 3 or 4 racemes, racemes 1.5–7 cm long, rachis 1–2 mm wide; spikelets usually solitary, 2.5–4 mm long; lower glume absent or sometimes developed as minute scale, upper glume as long as spikelet, 3–5-nerved, minutely pubescent; lower floret with lemma as long as spikelet; upper floret usually shorter than spikelet. **Fig. 36A.**

Widespread in the region, usually on damp or wet soils. A useful pasture grass but it can be a nuisance in lawns.

3. *Paspalum vaginatum* Swartz

SALTWATER COUCH

Paspalum distichum auct. non L.

Creeping perennial, rhizomatous, stoloniferous, erect or ascending, up to *ca* 50 cm tall; culms unbranched, nodes glabrous or with few hairs. Leaf sheaths glabrous except sometimes on margin towards summit; ligules *ca* 0.5–1 mm long; leaf blades linear, apex acute-acuminate, base slightly contracted, 3–15 cm \times 0.75–3 cm, \pm glabrous. Panicles with 2 racemes arising at apex of culm, rarely 3, racemes 1.5–7.5 cm long, rachis 1–2 mm wide; spikelets solitary, 3–4.5 mm long; lower glume usually absent, upper glume as long as spikelet, 3–5-nerved, glabrous; lower floret with lemma as long as spikelet; upper floret shorter than spikelet.

Known from around coastal salt-water swamps and from coastal sand dunes.

4. **Paspalum notatum* Fluegge

BAHIA GRASS

Rhizomatous perennial, mat-forming, up to *ca* 50 cm tall; culms unbranched, nodes glabrous. Leaf sheaths glabrous; ligules *ca* 0.3 mm long; leaf blades linear or broadly linear, apex attenuate, base somewhat contracted, up to 30 cm \times 0.3–0.6 cm, glabrous. Panicles usually with 2 racemes arising at apex of culm, rarely a third below, racemes 3–15 cm long, rachis \pm 1 mm wide; spikelets solitary, 2.5–4 mm long; lower glume absent, upper glume as long as spikelet, 3–5-nerved, glabrous; lower floret with lemma as long as spikelet, glabrous; upper floret slightly shorter than spikelet.

Native of Mexico and Cuba, introduced as a pasture plant and for erosion control, naturalized in a few places in eastern parts of the region.

5. **Paspalum paniculatum* L.

RUSSELL RIVER GRASS

Paspalum galmarra F. M. Bailey

Rhizomatous perennial, erect or ascending, up to *ca* 1 m tall; culms unbranched, nodes densely hairy. Leaf sheaths bearded at apex and base, sparsely to densely hairy elsewhere; ligules less than 1 mm long; leaf blades linear to linear-ovate, apex attenuate, narrowing to base, 7–35 cm \times 0.8–1.5 cm, \pm hirsute. Panicles up to *ca* 15 cm long, with 10–many racemes, racemes 2.5–9 cm long, rachis *ca* 0.5 mm wide; spikelets paired, giving racemes a 4-rowed appearance or rarely 2-rowed by abortion, 1.25–1.5 mm long; lower glume absent, upper glume as long as spikelet, 3-nerved, pubescent; lower floret with lemma as long as spikelet, pubescent; upper floret \pm as long as spikelet.

Native of tropical America and the West Indies; introduced as a pasture grass, naturalized in the Moreton and Wide Bay districts.

6. **Paspalum plicatulum* Michaux

PLICATULUM

Tufted rhizomatous perennial, erect or ascending, up to 1.5 cm tall; culms unbranched, nodes glabrous. Leaf sheaths glabrous or with few hairs; ligules 2–3 mm long; leaf blades linear, apex attenuate, base somewhat contracted, 10–40 cm \times 0.2–0.5 cm, usually with at least a few hairs towards base, sometimes sparsely pubescent. Panicles up to *ca* 13 cm long, with 3–5 racemes, racemes 2–10 cm long, rachis 0.5–1 mm wide; spikelets paired or a few solitary by abortion, 2.5–3 mm long, occasionally larger in cultivated specimens; lower glume absent, upper glume as long as spikelet, *ca* 3-nerved, glabrous or minutely hairy; lower floret with lemma as long as spikelet, glabrous or with few hairs at base; upper floret \pm as long as spikelet.

Native of south-eastern United States of America to Central America; probably introduced as an experimental pasture plant, naturalized in a few places in eastern parts of the region.

7. *Paspalum dilatatum Poiret**PASPALUM**

Tufted perennial, erect or ascending, up to *ca* 1 m tall, rarely taller; culms unbranched or sparingly branched, nodes glabrous or lower sparsely hairy. Leaf sheaths glabrous or lower ones pilose; ligules up to 3 mm long; leaf blades linear, apex attenuate, base slightly contracted, 6–45 cm \times 0.3–1.2 cm, glabrous except sometimes a few hairs at base, minutely scabrous on margin. Panicles up to 25 cm long, with 2–11 racemes scattered along axis, racemes 2.5–11 cm long, rachis 1–1.3 mm wide; spikelets paired, giving raceme a 4-rowed appearance, 2.8–4 mm long; lower glume absent, upper glume as long as spikelet, 5–9-nerved, sparsely pubescent, usually with long fine hairs on margin; lower floret with lemma slightly shorter than spikelet, usually with few hairs; upper floret shorter than spikelet. **Fig. 36D.**

Native of South America; naturalized and widespread throughout the region. It is highly regarded as a fodder grass but is also a common weed of lawns and roadsides. The grass itself is not poisonous to stock but inflorescences are often infested by an ergot fungus which at certain stages is poisonous to stock.

8. *Paspalum urvillei Steudel**VASEY GRASS**

Densely tufted perennial, erect, up to 2.5 m tall; culms sometimes branching at lower nodes, nodes usually glabrous. Lower leaf sheaths with sparse to moderately dense hairs, upper sheaths less hairy or \pm glabrous; ligules 3–5 mm long; leaf blades linear to linear-ovate, apex attenuate, base narrowed, 10–50 cm \times 0.3–1.5 cm, glabrous except for few long hairs at base of upper surface. Panicles up to 40 cm long with 6–30 racemes, racemes 5–15 cm long, rachis *ca* 0.8 mm wide; spikelets in pairs giving racemes 4-rowed appearance, 2–3 mm long; lower glume absent, upper glume as long as spikelet, 3–5-nerved, with sparse appressed silky hairs, margin with long silky hairs; lower floret with lemma as long as spikelet, \pm glabrous except for fringe of long hairs on margin; upper floret shorter than spikelet. **Fig. 36B.**

Native of South America; possibly introduced as a pasture grass but now naturalized and widespread.

9. *Paspalum exaltatum Presl

Tufted perennial, erect, up to 2 m tall, culms unbranched; nodes glabrous. Leaf sheaths glabrous except on margin towards summit; ligules *ca* 3 mm long; leaf blades linear, apex acute-acuminate, base somewhat contracted, 40–80 cm \times 1–2 cm, glabrous, scabrous on margin. Panicles up to *ca* 30 cm long, with up to 30 racemes scattered along axis, racemes up to 10 cm long, rachis less than 1 mm wide; spikelets dense, 3–4 mm long; lower glume absent, upper glume as long as spikelet, 3–5-nerved, sparsely pubescent; lower floret with lemma slightly shorter than spikelet, hairy on margin, or glabrous, upper floret shorter than spikelet.

Native of South America; recorded as naturalized in the Wide Bay district.

10. *Paspalum quadrifarium Lam.**TUSSOCK PASPALUM**

Tufted perennial, \pm erect, up to *ca* 1.8 m tall; culms unbranched, nodes glabrous. Leaf sheaths mostly glabrous, except near ligules; ligules 1–2 mm long; leaf blades linear or broadly linear, apex attenuate, base usually narrowed, 15–40 cm \times 0.5–0.8 cm, glabrous or sparsely hairy. Panicles up to 25 cm long, with mostly 15–25 racemes, racemes 6–8 cm long, rachis *ca* 0.5 mm wide; spikelets paired, giving racemes 4-rowed appearance, 2–2.6 mm long; lower glume absent, upper glume as long as spikelet, 3-nerved, pubescent; lower floret with lemma as long as spikelet, \pm glabrous to pubescent; upper floret \pm as long as spikelet.

Native of Uruguay; probably introduced for experimental pasture work, apparently naturalized in the Moreton district but rarely collected.

11. Paspalum scrobiculatum L.**DITCH MILLET**

Paspalum orbiculare G. Foster; *P. comersonii* Lam.

Tufted perennial, erect or ascending, up to 1.5 m tall; culms rarely branched, nodes glabrous. Leaf sheaths glabrous or with few hairs; ligules 1–2 mm long; leaf blades linear, apex attenuate, base slightly narrowed, 8–25 cm \times 0.2–0.7 cm, glabrous except for few hairs at junction with sheath. Panicles *ca* 4–12 cm long, with 2–5 racemes, racemes 1.5–8 cm long, rachis 1.5–2 mm wide; spikelets usually solitary, in 2 rows along raceme, 2–3

mm long, glabrous; lower glume absent, upper glume as long as spikelet, 3–7-nerved; lower floret with lemma as long as spikelet; upper floret with lemma as long as spikelet. **Fig. 36C.**

Widespread in the region except in the Burnett district, but probably to be found there also, usually in damp situations.

12. *Paspalum longifolium* Roxb.

Paspalum scrobiculatum L. var. *longifolium* (Roxb.) Domin

Tufted perennial, \pm erect, up to 1.5 m tall; culms unbranched, nodes glabrous. Leaf sheaths glabrous or with few hairs on upper margin; ligules up to ca 2 mm long; leaf blades linear, apex attenuate, base contacted, up to ca 50 cm \times 0.3–0.8 cm, \pm glabrous, margin minutely scabrous. Panicles up to ca 20 cm long, with up to ca 7 racemes, rarely more, racemes up to ca 8 cm long, rachis 2–3 mm broad; spikelets paired, giving raceme a 4-rowed appearance, 2–3 mm long; lower glume absent, upper glume as long as spikelet, ca 3-nerved, minutely pubescent to \pm glabrous; lower floret with lemma as long as spikelet, minutely pubescent to \pm glabrous; upper floret slightly shorter than spikelet. **Fig. 36E.**

Known from the Moreton and Wide Bay districts, usually on damp soils.



Fig. 36 POACEAE — A–E *Paspalum* spp. — A₁–A₂ *P. distichum*, A₁ inflorescence \times 1, A₂ spikelet \times 12; B *P. urvillei*, inflorescence \times 1; C *P. scrobiculatum*, inflorescence \times 1; D *P. dilatatum*, spikelet \times 12; E *P. longifolium*, part of inflorescence \times 1.

82. AXONOPUS Beauv.

Tufted or stoloniferous perennials, rarely annuals. Ligules membranous; leaf blades flat, folded or involute. Inflorescences of 2-many slender digitate or subdigitate spike-like racemes; spikelets solitary, alternate on rachis and closely appressed to it, florets 2, lower sterile and reduced to lemma, upper bisexual; lower glume absent, upper glume \pm membranous, as long as spikelet, 4-5-nerved; lower floret with lemma as long as spikelet; upper floret with lemma shorter than or equal to spikelet, margin inrolled and clasping edges of palea, palea \pm as long as lemma; stamens 3; styles distinct. Caryopses tightly enclosed by hardened lemma and palea.

About 110 species, tropical and subtropical regions of the world but mostly South America; 2 species naturalized Australia, both occurring in south-eastern Queensland.

- | | |
|---|-------------------------|
| 1. Margins of leaf blades glabrous; fertile florets \pm equal in length to spikelets | 1. <i>A. affinis</i> |
| Margins of leaf blades with tubercular-based hairs; florets distinctly shorter than spikelets | 2. <i>A. compressus</i> |

1. **Axonopus affinis* A. Chase

NARROWLEAF CARPET GRASS

Axonopus compressus auct. non (Swartz) Beauv.; *Paspalum compressum* auct. non (Swartz) Raspoil

Stoloniferous perennial up to ca 60 cm tall, forming mat over soil surface; culms simple, much compressed and angular, nodes glabrous. Leaf sheaths compressed, glabrous; ligules a minutely ciliolate rim; leaf blades linear or broadly linear, flat or folded, apex \pm obtuse, base slightly contracted, 5-20 cm \times 0.2-0.6 cm, glabrous or with few long hairs at base. Inflorescences with 2 or 3, rarely -5 racemes, racemes 2-10 cm long; spikelets ca 2 mm long; upper floret \pm equal in length to spikelet.

Native of tropical America; naturalized in eastern parts of the region. Useful as a fodder grass in pastures on poor quality soils, but is regarded as a nuisance in better pastures. It is considered a weed in lawns of fine-leaf grasses.

2. **Axonopus compressus* (Swartz) Beauv.

BROADLEAF CARPET GRASS

Milium compressum Swartz; *Paspalum platycaulon* Poir., sometimes misspelt *platycaule*; *P. compressum* (Swartz) Raspaill

Stoloniferous perennial up to 60 cm tall, forming mat over soil surface; culms simple, much compressed and angular, nodes pubescent. Leaf sheaths compressed, glabrous or \pm hirsute; ligules a minutely ciliolate rim; leaf blades linear to linear-ovate, flat or folded, apex obtuse or bluntly acute, base \pm rounded, 2-16 cm \times 0.3-1.1 cm, with tubercular-based hairs on margin, otherwise glabrous or \pm hirsute. Inflorescences with 2 or 3, rarely -5 racemes, racemes 2-10 cm long; spikelets 2-2.5 mm long; upper floret distinctly shorter than spikelet, 1.8-2 mm long. **Fig. 35K.**

Native of tropical America; naturalized in the Moreton and Wide Bay districts. Useful pasture and lawn grass in most places. It is considered a weed in lawns of fine-leaf grasses.

83. ENTOLASIA Stapf

Perennials, sometimes with short rhizomes. Ligules reduced to line of hairs; leaf blades flat or involute. Inflorescences panicles of racemes; spikelets solitary, florets 2, lower sterile, upper bisexual; glumes unequal, lower small, upper as long as spikelet, faintly 5-nerved; lower floret with lemma as long as spikelet, palea absent; upper floret as long as or shorter than spikelet, lemma pubescent, palea as long as lemma; stamens 3; styles distinct.

5 species, 2 in tropical Africa and 3 in Australia; 3 species south-eastern Queensland.

- | | |
|--|------------------------|
| 1. Spikelets 4-6 mm long | 1. <i>E. whiteana</i> |
| Spikelets 2.5-3.8 mm long | 2 |
| 2. Upper florets scarcely shorter than spikelets | 2. <i>E. stricta</i> |
| Upper florets distinctly shorter than spikelets | 3. <i>E. marginata</i> |

1. *Entolasia whiteana* C. E. Hubbard

Tufted perennial with short rhizome, erect or ascending, up to *ca* 80 cm tall; culms branched, nodes sparsely to densely hairy. Leaf sheaths glabrous to hirsute; leaf blades linear, apex attenuate, 1–10 cm \times 0.1–0.5 cm, glabrous or hirsute. Panicles up to 10 cm long with 2–9 racemes, racemes up to *ca* 3 cm long; spikelets 4–6 mm long; lower glume $\frac{1}{4}$ – $\frac{1}{3}$ length of spikelet, glabrous, upper glume glabrous; lower floret with lemma glabrous; upper floret 3.5–4.6 mm long, lemma and palea pubescent. **Fig. 37B.**

Known from eastern parts of the region, often in dry stony or sandy areas.

2. *Entolasia stricta* (R. Br.) Hughes**WIRY PANIC**

Panicum strictum R. Br.; *P. marginatum* var. *strictum* (R. Br.) Benth.; *P. strictum* var. *hirsutum* Domin

Loosely tufted perennial, erect or ascending, up to 80 cm tall, occasionally taller; culms often branched, nodes sparsely to densely hairy. Leaf sheaths glabrous or hirsute; leaf blades linear, incurved to involute, apex attenuate, 0.5–10 cm \times 0.1–0.7 cm, glabrous or hirsute. Panicles up to 10 cm long, with 2–9 racemes, racemes 1–7 cm long, occasionally whole inflorescence reduced to simple spike-like raceme; spikelets 2.25–3.8 mm long; lower glume $\frac{1}{4}$ – $\frac{1}{3}$ length of spikelet, glabrous, upper glume glabrous; lower floret with lemma glabrous; upper floret \pm as long as spikelet, lemma and palea pubescent.

Widespread in eastern parts of the region, usually on poor stony or sandy soils.

3. *Entolasia marginata* (R. Br.) Hughes**BORDERED PANIC**

Panicum marginatum R. Br.; *P. marginatum* var. *majus* Benth.

Perennial with short rhizomes, \pm erect or decumbent, up to *ca* 60 cm tall, rarely taller; culms branching, nodes \pm glabrous to \pm pubescent. Leaf sheaths glabrous to hirsute; leaf blades narrowly ovate, flat, apex \pm acuminate, base rounded, 2–20 cm \times 0.2–1.5 cm, glabrous or \pm hirsute. Panicles up to *ca* 20 cm long, with 3–10 racemes, racemes 1–12 cm long, sometimes reduced to few spikelets; spikelets 2.5–3.8 mm long; lower glume *ca* $\frac{1}{4}$ length of spikelet, glabrous, upper glume glabrous; lower floret with lemma glabrous; upper floret shorter than spikelet, 2–3 mm long, lemma and palea pubescent.

Widespread in the region, particularly common in the Moreton district.

84. *CLEISTOCHLOA* C. E. Hubbard

Perennials. Ligules reduced to row of hairs; leaf blades short, rigid. Inflorescences with chasmogamous spikelets in simple spike-like terminal racemes, or in simple spike-like panicles of few racemes; cleistogamous spikelets also present and borne singly in axils of leaf sheaths; spikelets with 2 florets, lower floret sterile, reduced to lemma, upper bisexual; lower glume very small, upper glume \pm as long as spikelet or shorter than spikelet, 5–7-nerved; lower floret \pm as long as spikelet; upper floret \pm as long as spikelet, 5–9-nerved, ciliolate at apex, palea as long as lemma; stamens 3; styles distinct.

3 species, endemic in Queensland and northern New South Wales; 2 species south-eastern Queensland.

1. Inflorescences with chasmogamous spikelets in simple spike-like terminal racemes; upper glumes of axillary cleistogamous spikelets not densely pubescent

1. *C. subjuncea*

Inflorescences with chasmogamous spikelets, in spike-like panicles of few racemes; upper glumes of axillary cleistogamous spikelets densely pubescent

2. *C. rigida*

1. *Cleistochloa subjuncea* C. E. Hubbard

Panicum subjunceum auct. non Ekman, Domin; *Cleistochloa hubbardiana* Henrard

Perennial, erect or ascending, up to 60 cm tall; culms branching, nodes glabrous or hirsute. Leaf sheaths glabrous or sparsely to densely hirsute; leaf blades linear or linear-ovate, flat to convolute, apex attenuate, base narrowed, 1–5 cm \times 0.5–0.28 cm, \pm hirsute, often glabrescent. Racemes of chasmogamous spikelets up to 2.5 cm long, spikelets 3.5–4.5 mm long, lower glume less than 1 mm long, upper glume slightly shorter than spikelet, ciliolate at apex; cleistogamous spikelets 4–6 mm long, lower glume less

than 0.5 mm long, upper glume 3–4.5 mm long, glabrous or ciliolate at apex.

Widespread in the region, usually on sandstone ridges.

2. *Cleistochloa rigida* (S. T. Blake) R. Webster

Dimorphochloa rigida S. T. Blake

Tufted perennial up to *ca* 1 m tall; culms branched, nodes sparsely to densely hairy. Leaf sheaths hirsute, often glabrescent; leaf blades linear, apex attenuate, 2–8 cm × 0.2–0.3 cm, sparsely to densely pilose. Panicles of chasmogamous spikelets usually 3–8.5 cm long, racemes 2–8, up to 1.7 cm long, spikelets *ca* 5 mm long, lower glume minute or absent, upper glume pubescent, lower floret with lemma pubescent, upper floret with lemma glabrous except for sparsely ciliate margin; cleistogamous spikelets 5–7 mm long, upper glume densely pubescent, lower floret with lemma pubescent, upper floret with lemma glabrous except for ciliolate margin.

Widespread in the region, usually on dry stony, often sandstone ridges; not common.

85. *ERIOCHLOA* Kunth

Annuals or perennials. Ligules reduced to ciliate rim; leaf blades \pm flat. Inflorescences panicles of racemes; spikelets solitary or in pairs, with distinct bead-like swelling at base, florets 2, lower male or sterile, upper bisexual; glumes unequal, lower glume reduced to minute cupular sheath clasping bead-like swelling, upper glume as long as spikelet, faintly 5-nerved; lower floret with lemma as long as spikelet or slightly shorter, palea \pm as long as lemma or reduced or absent; upper floret shorter than spikelet, palea \pm as long as lemma; stamens 3; styles distinct.

About 30 species, tropical and subtropical parts of the world; 5 species Australia; 3 species south-eastern Queensland.

- | | | | | | | |
|---|---|---|---|---|---|-------------------------------|
| 1. Upper glumes drawn out into bristle | . | . | . | . | . | 1. <i>E. pseudoacrotricha</i> |
| Upper glumes not drawn out into bristle | . | . | . | . | . | 2 |
| 2. Spikelets 3.7–5 mm long; robust plants | . | . | . | . | . | 2. <i>E. crebra</i> |
| Spikelets 3–3.7 mm long; slender plants | . | . | . | . | . | 3. <i>E. procera</i> |

1. *Eriochloa pseudoacrotricha* (Stapf ex Thell.) J. M. Black

SPRING GRASS;
CUPGRASS

Perennial, erect or ascending, up to 1 m tall; culms branching, nodes pubescent. Leaf sheaths glabrous, or pubescent at base; ligules *ca* 1 mm long; leaf blades linear, 3–30 cm × 0.15–0.4 cm, pubescent near ligule and sometimes on lower surface, otherwise glabrous. Panicles up to *ca* 18 cm long, with 2–10 appressed or slightly spreading racemes each 2–10 cm long; spikelets 4–6 mm long, with appressed hairs in lower $\frac{2}{3}$; upper glume tapering to bristle; lower floret with lemma \pm as long as spikelet; upper floret with lemma $\frac{2}{5}$ – $\frac{3}{5}$ length of spikelet, apex with short mucro. **Fig. 37C.**

Widespread in the region in a variety of habitats. A useful fodder grass.

2. *Eriochloa crebra* S. T. Blake

SPRING GRASS; CUPGRASS

Perennial, erect, up to *ca* 1 m tall; culms simple or with few branches, nodes glabrous or occasionally minutely pubescent. Leaf sheaths glabrous; ligules *ca* 1 mm long; leaf blades linear, apex attenuate, 8–25 cm × 0.2–0.6 cm, glabrous below, upper surface with minute hairs. Panicles up to 25 cm long, with 5–25 appressed or slightly spreading racemes, each 1.5–5 cm long; spikelets 3.7–5 mm long, with appressed hairs in lower $\frac{2}{3}$; upper glume \pm acute; lower floret with lemma as long as spikelet; upper floret with lemma *ca* $\frac{2}{5}$ – $\frac{2}{3}$ length of spikelet, apex with short mucro.

Known from a few places in western parts of the region, usually on black soils; rare. A useful fodder grass.

3. *Eriochloa procera* (Retz.) C. E. Hubbard

SPRING GRASS; CUPGRASS

Agrostis procera Retz.; *Eriochloa ramosa* (Retz.) Kuntze; *Eriochloa annulata* (Fluegge) Kunth

Slender perennial, erect or ascending, up to 75 cm tall; culms not branched, nodes

glabrous. Leaf sheaths glabrous; ligules *ca* 0.75 mm long; leaf blades linear, apex attenuate, 5–15 cm \times 0.1–0.6 cm, glabrous. Panicles up to *ca* 15 cm long, with 5–20 appressed or somewhat spreading racemes each usually 1.5–4 cm long; spikelets 3–3.7 mm long, with appressed hairs in lower $\frac{2}{3}$; upper glume \pm acute; lower floret with lemma slightly shorter than spikelet; upper floret with lemma *ca* $\frac{2}{3}$ – $\frac{5}{6}$ length of spikelet, apex with short mucro.

Widespread in the region, in a variety of habitats. A useful fodder grass.

Eriochloa meyeriana (Nees) Pilger, a species with robust geniculate ascending culms rooting at the nodes and with the lower glume *ca* 0.5 mm long may be naturalized in the northern Moreton district. It is native of tropical and southern Africa.

86. OTTOCHLOA Dandy

Perennials. Ligules short to obscure; leaf blades flat. Inflorescences panicles with primary branches each terminating in a raceme and sometimes secondary branches each terminating in a raceme; spikelets solitary, florets 2, lower sterile and reduced to lemma, upper bisexual; glumes much shorter than spikelet, lower 3-nerved, upper 3–5-nerved; lower floret with lemma as long as spikelet, 7-nerved; upper floret with lemma \pm as long as spikelet, obscurely 5-nerved, palea as long as lemma, 2-nerved; stamens 3; styles distinct.

6 species, tropical Africa, south-eastern Asia and Australia; 2 species Australia, both occurring in south-eastern Queensland.

- | | |
|---|-------------------------|
| 1. Spikelets <i>ca</i> 2 mm long; inflorescences mostly less than 6 cm long, with
2–4 primary branches | 1. <i>O. gracillima</i> |
| Spikelets 3–3.5 mm long; inflorescences mostly more than 6 cm long,
with 4–12 primary branches | 2. <i>O. nodosa</i> |

1. *Ottochloa gracillima* C. E. Hubbard

Slender perennial, decumbent, up to 30 cm tall, rooting at lower nodes; culms unbranched or sparsely branched, nodes glabrous or with few hairs. Leaf sheaths glabrous or with sparse tubercular-based hairs, ciliate on at least one margin; ligules short; leaf blades linear or linear-ovate, apex attenuate, base abruptly contracted, 1–7 cm \times 0.15–0.6 cm, glabrous or with few tubercular-based hairs. Panicles up to 6 cm long, primary branches 2–4, lower ones up to 5 cm long and usually again branched, each secondary branch with 2–4 spikelets, upper primary branches shorter than lower; spikelets 2–2.3 mm long; lower glume *ca* 1 mm long, glabrous, upper glume *ca* 1.3 mm long, glabrous; lower floret with lemma glabrous or with few hairs; upper floret glabrous. **Fig. 37D.**

Known from the Moreton and Wide Bay districts, usually in shady places.

2. *Ottochloa nodosa* (Kunth) Dandy

Panicum nodosum Kunth

Decumbent perennial, up to *ca* 45 cm tall, rooting at lower nodes; culms usually unbranched, nodes glabrous or with few hairs. Leaf sheaths glabrous except for ciliate margin; ligules short; leaf blades linear or linear-ovate, 1.8–15 cm \times 0.2–0.9 cm, glabrous or with few hairs at base. Panicles up to *ca* 20 cm long, primary branches 4–12, lower ones up to *ca* 15 cm long, usually with secondary branching, these usually with several spikelets; spikelets *ca* 3–3.5 mm long; lower glume *ca* $\frac{1}{3}$ – $\frac{1}{2}$ as long as spikelet, glabrous, upper glume *ca* $\frac{1}{2}$ – $\frac{2}{3}$ as long as spikelet; lower floret with lemma glabrous; upper floret glabrous.

Known from the Moreton and Wide Bay districts, usually in shady places.

87. ALLOTEROPSIS C. Presl

Annuals or perennials. Ligules short or reduced to a rim; leaf blades flat to \pm convolute. Inflorescences of often compound racemes, these digitate or in whorls on short axes;

spikelets paired or in clusters, florets 2, lower usually male, upper bisexual; lower glume shorter than spikelet, 1–5-nerved, often shortly awned, upper glume as long as spikelet, 5-nerved, ciliate on margin; lower floret with lemma as long as spikelet, not ciliate on margin, palea short, deeply 2-fid; upper floret with lemma 5-nerved, produced into awn, palea \pm as long as lemma; stamens 3; styles distinct.

5 species, tropical and subtropical Africa, Asia, Australia and New Caledonia; 2 species Australia; 1 species south-eastern Queensland.

1. *Alloteropsis semialata* (R. Br.) A. S. Hitchc.

COCKATOO GRASS

Panicum semialatum R. Br.; *Axonopus semialatus* (R. Br.) J. D. Hook.

Tufted perennial, erect, up to ca 1 m tall; culms unbranched, nodes \pm pubescent. Lower leaf sheaths silky pubescent, upper sheaths often glabrous; ligules reduced to ciliate rim; leaf blades linear, apex attenuate, base \pm narrowed, 15–30 cm \times 0.1–0.75 cm, glabrous or loosely hairy. Inflorescences of 1–5 digitate racemes, racemes 3–20 cm long and often compound; spikelets 5–7.5 mm long; lower glume 3–3.75 mm long, 3–5-nerved, glabrous or minutely pubescent, shortly awned or mucronate, upper glume with marginal cilia ca 1 mm long, occasionally margin also \pm winged; lower floret with lemma glabrous or pubescent upwards, palea ca 2.5 mm long; upper floret with lemma ca as long as spikelet, often produced into awn up to 4 mm long. **Fig. 37E.**

Widespread in the region, usually on sandy soils or soils derived from sandstone.

88. CALYPTOCHLOA C. E. Hubbard

Perennials. Ligules ciliate; leaf blades flat. Inflorescences terminal racemes with chasmogamous spikelets and solitary axillary cleistogamous spikelets; spikelets few, florets 2, lower sterile, reduced to lemma, upper bisexual; lower glume minute in chasmogamous spikelets, absent in cleistogamous spikelets, upper glume 7-nerved, ca as long as spikelet in chasmogamous spikelets, less than $\frac{1}{2}$ as long as cleistogamous spikelets; lower floret with lemma ca as long as spikelet; upper floret with lemma as long as spikelet, cuspidate or shortly awned; stamens 3; styles distinct.

1 species endemic in southern Queensland, occurring in south-eastern Queensland.

1. *Calypochloa gracillima* C. E. Hubbard

Prostrate or ascending perennial up to ca 30 cm tall; culms branched, nodes \pm hairy. Leaf sheaths usually swollen at base, usually with sparse tubercular-based hairs; ligules minute; leaf blades linear-ovate, apex acute-acuminate, base abruptly contracted, 1.5–3.5 cm \times 0.2–0.45 cm, with sparse to dense tubercular-based hairs, margin minutely scabrous. Racemes 1–1.5 cm long, with up to 7 spikelets, spikelets 3–3.5 mm long, lower glume ca 0.2 mm long, upper glume \pm spreading, ca 3 mm long, silky hairy in lower part, lower floret with lemma silky hairy in lower part, upper floret with lemma cuspidate or with awn up to 2 mm long, glabrous, palea \pm as long as lemma excluding awn, glabrous; axillary spikelets concealed in swollen base of some of upper leaf sheaths, 4–5.5 mm long, upper glume 0.5–1.5 mm long, rarely longer, lower floret with lemma 4–5 mm long, with tuft of minute hairs at base, upper floret with lemma cuspidate or with awn up to 2 mm long, glabrous, palea somewhat shorter than lemma. **Fig. 37F.**

Known in the region only from the central Burnett district and from around Chinchilla in the Darling Downs district.

89. HOMOPHOLIS C. E. Hubbard

Perennials. Ligules short, membranous; leaf blades flat. Inflorescences lax panicles, many-branched, each branch with a terminal spikelet; spikelets with 2 florets, lower floret sterile, upper bisexual; lower glume well developed, \pm as long as spikelet, 7-nerved, upper glume \pm as long as spikelet, 7-nerved; lower floret with lemma ca as long as spikelet, palea minute, bilobed; upper floret with lemma $\frac{1}{2}$ – $\frac{3}{4}$ length of spikelet, 5–7-nerved, palea ca as long as lemma; stamens 3; styles distinct.

1 species endemic in western Darling Downs district and north-western New South Wales.

13. Spikelets 2.3–2.75 mm long; racemes usually 2 or 3 per inflorescence	11. <i>D. didactyla</i>	
Spikelets 2.6–3.6 mm long, if 2.6–3 mm long then racemes 4–9 per inflorescence		14
14. Margins of rachis and pedicels smooth	12. <i>D. heterantha</i>	
Margins of rachis and pedicels scabrous		15
15. Perennials with rhizomes or stolons; culms \pm erect	13. <i>D. eriantha</i>	
Annuals with stolons; culms decumbent to ascending	14. <i>D. ciliaris</i>	
16. Spikelets 2.5–3.5 mm long		17
Spikelets 1.2–2.1 mm long		18
17. Spikelets enveloped in long silky hairs which much exceed the spikelet	15. <i>D. brownii</i>	
Spikelets pubescent between nerves but hairs not much exceeding spikelet	16. <i>D. baileyi</i>	
18. Upper glume $\frac{1}{4}$ – $\frac{1}{2}$ length of spikelet		19
Upper glume $\frac{3}{4}$ to as long as spikelet		20
19. Lower lemmas glabrous	17. <i>D. breviglumis</i>	
Lower lemmas pubescent or at least with a few hairs on margin	18. <i>D. orbata</i>	
20. Lemmas of upper florets \pm smooth, papillae poorly developed at maturity	19. <i>D. diffusa</i>	
Lemmas of upper florets papillose, papillae well developed at maturity		21
21. Racemes 0.7–3.5 cm long; spikelets 1.2–1.5 mm long	20. <i>D. minima</i>	
Racemes 4–15 cm long; spikelets 1.5–2.1 mm long		22
22. Upper glume $\frac{1}{2}$ – $\frac{3}{4}$ length of spikelet	21. <i>D. ramularis</i>	
Upper glume \pm equal in length to spikelet	22. <i>D. parviflora</i>	

1. *Digitaria porrecta* S. T. Blake

Digitaria coenicola (F. Muell.) Hughes var. *ramosa* Vickery

Perennial, loosely tufted, erect or ascending, up to ca 60 cm tall; culms branched, nodes pubescent. Leaf sheaths glabrous, or with few hairs especially towards base; ligules membranous, 2–3 mm long; leaf blades linear, apex attenuate, 5–15 cm \times 0.3–0.4 cm, pubescent or glabrous. Inflorescences panicles of several racemes, racemes up to 25 cm long, lowermost racemes whorled, branched, branches divaricate, 3–10 cm long, upper racemes solitary; spikelets in pairs, 5–7 mm long; lower glume 1–1.5 mm long, upper glume somewhat shorter than spikelet, pubescent between nerves, hairs at first appressed, at length spreading and woolly; lower floret with lemma as long as spikelet, pubescent between outer nerves, hairs at first appressed, at length spreading and woolly; upper floret shorter than spikelet.

Darling Downs district, on heavy black soils.

2. *Digitaria hystrichoides* Vickery

Perennial, tufted, erect or ascending, up to 60 cm tall; culms often branched, nodes pubescent. Leaf sheaths usually with dense tubercular-based hairs or woolly pubescent, rarely sparsely hairy; ligules membranous, 1–2 mm long; leaf blades linear, apex attenuate, 8–15 cm \times 0.3–0.6 cm, with sparse to dense tubercular-based hairs. Inflorescences panicles of racemes, lower racemes in whorl of 6–10, upper racemes solitary or \pm whorled, racemes up to 30 cm long; spikelets paired or upper ones solitary, 2.2–3.5 mm long; lower glume ca 0.5 mm long, upper glume somewhat shorter than spikelet, 3-nerved, with fine silky or woolly hairs between nerves and on margin, at length hairs spreading; lower floret with lemma as long as spikelet with dense silky or woolly hairs; upper floret with lemma ca $\frac{2}{3}$ length of spikelet. **Fig. 37H.**

Known from the western Darling Downs district.

3. *Digitaria tonsa* Hughes*Panicum divaricatissimum* R. Br. var. *radiatum* Benth.

Perennial, erect, up to *ca* 75 cm tall; culms unbranched or with few branches, nodes glabrous or rarely pubescent. Leaf sheaths with \pm dense spreading tubercular-based hairs; ligules membranous, 1.5–3.5 mm long; leaf blades linear or broadly-linear, apex attenuate, 8–22 cm \times 0.3–0.8 cm, pubescent, at least some of hairs tubercular-based. Inflorescences panicles of several racemes, lower racemes whorled, upper ones solitary or in pairs or sometimes in whorls, racemes up to *ca* 35 cm long; spikelets mostly paired, 2.1–2.5 mm long; lower glume up to *ca* 0.7 mm long, upper glume slightly shorter than spikelet, 3-nerved, pubescent; lower floret with lemma as long as spikelet, pubescent except between midnerve and first lateral nerve; upper floret with lemma *ca* as long as spikelet. **Fig. 371.**

Known from a few localities in the Moreton and Burnett districts.

4. *Digitaria ammobila* Hughes**SILKY UMBRELLA GRASS**

Panicum divaricatissimum R. Br. var. *ammophilum* Benth.; *Digitaria ammobila* var. *macrolepis* Henrard; *P. ammobilum* auct. non Steudel, F. Muell.

Perennial, \pm erect, up to 60 cm tall; culms often branched, nodes pubescent, glabrescent. Leaf sheaths densely pubescent; ligules membranous, 1–3 mm long; leaf blades linear, narrowing upwards, 6–20 cm \times 0.3–0.7 cm, densely pubescent. Inflorescences panicles of racemes, rachis of panicle *ca* 7–12 cm long, lower racemes usually in a whorl and 10–20 cm long, upper racemes solitary and shorter; spikelets in pairs, *ca* 2.5 mm long, covered with silky hairs; lower glume *ca* 0.5 mm long, upper glume as long as spikelet, 3-nerved; lower floret with lemma as long as spikelet; upper floret with lemma slightly shorter than spikelet.

Widespread but seldom collected, usually in drier sites.

5. *Digitaria divaricatissima* (R. Br.) Hughes**UMBRELLA GRASS**

Panicum divaricatissimum R. Br.; *P. macractinium* Benth.; *P. divaricatissimum* var. *glaberrimum* Benth.; *P. divaricatissimum* var. *normale* Benth.; *P. divaricatissimum* var. *macractinium* (Benth.) Domin; *Digitaria divaricatissima* var. *dasyantha* Henrard; *D. macractinia* (Benth.) Hughes; *D. macractinia* subsp. *muelleriana* Henrard; *D. macractinia* subsp. *leichhardtiana* Henrard; *D. macractinia* var. *dasyantha* Henrard

Perennial, loosely tufted, erect or ascending, up to *ca* 80 cm tall; culms sparsely branched, nodes glabrous or pubescent. Leaf sheaths \pm pubescent, sometimes glabrescent; ligules membranous, 2–3 mm long; leaf blades linear, apex long attenuate, 4–15 cm \times 0.3–0.6 cm, sparsely to densely hairy, often glabrescent. Inflorescences panicles of several racemes, lower racemes in a whorl of *ca* 4–6 and 7–35 cm long, upper racemes borne singly along axis; spikelets mostly in pairs, sometimes lower ones solitary, 3.5–5 mm long, \pm hairy, hairs at first appressed, at length spreading; lower glume $\frac{1}{8}$ – $\frac{1}{4}$ as long as spikelet, upper glume *ca* $\frac{1}{2}$ to slightly shorter than spikelet, 3-nerved; lower floret with lemma as long as spikelet, 5–7-nerved; upper floret with lemma slightly shorter than spikelet, papillose at maturity.

Widespread in the region, particularly in the Moreton and Darling Downs districts, usually in open woodland communities; common.

6. *Digitaria leucostachya* (Domin) Henrard*Panicum leucostachyum* Domin

Perennial, tufted, erect, up to *ca* 80 cm tall; culms unbranched, nodes glabrous. Leaf sheaths glabrous; ligules membranous, 0.4–0.9 mm long; leaf blades linear, apex long tapering, 10–25 cm \times 0.2–0.8 cm, glabrous, scabrous above. Inflorescences panicles of 1–4 racemes, racemes solitary along axis, 9–30 cm long; spikelets usually in pairs, sometimes solitary, sometimes apparently clustered near base, 2.1–2.9 mm long excluding indumentum, densely clothed in silky hairs which exceed spikelet; lower glume absent or up to 0.3 mm long, upper glume *ca* as long as spikelet, 3-nerved, densely silky hairy; lower floret with lemma as long as spikelet, densely silky hairy; upper floret as long as or slightly shorter than spikelet.

Widespread in sandy coastal areas, also recorded from the Burnett district; relatively common.

7. **Digitaria sanguinalis* (L.) Scop.**CRABGRASS; SUMMERGRASS***Panicum sanguinale* L.

Annual, ascending or prostrate and rooting at nodes, up to *ca* 60 cm tall; culms branched or unbranched, nodes glabrous or sparsely hairy. Leaf sheaths almost glabrous or with sparse tubercular-based hairs; ligules membranous, 0.5–2.5 mm long; leaf blades linear to narrowly ovate, apex acuminate, base contracted and often rounded, 3–17 cm × 0.2–0.8 cm, with sparse to moderately dense tubercular-based hairs. Inflorescences of 4–9 racemes, ± digitate, solitary or ± whorled, axis up to 5 cm long, each raceme 3–30 cm long; spikelets in pairs, 2–3 mm long; lower glume up to 0.9 mm long, upper glume $\frac{1}{3}$ – $\frac{3}{4}$ length of spikelet, 3-nerved, glabrous or pubescent; lower floret with lemma as long as spikelet, spinules on lateral or all nerves, sometimes only towards apex; upper floret with lemma *ca* as long as spikelet. **Fig. 37J.**

Native of temperate Asia, Europe and America; naturalized in eastern Darling Downs district, often as a weed in gardens, orchards or on roadsides.

8. **Digitaria violascens* Link*Paspalum minutiflorum* Steudel; *P. steudelianum* Domin; *Digitaria recta* Hughes

Annual, ascending or ± erect, up to 50 cm tall; culms mostly unbranched, nodes glabrous. Leaf sheaths glabrous or lower one with few hairs; ligules membranous, 0.5–2 mm long; leaf blades linear, apex acuminate, 3–22 cm × 0.2–0.6 cm, glabrous or with few tubercular-based hairs. Inflorescences panicles of 4–13 racemes, rarely 2 or 3, racemes digitate or subdigitate, occasionally lower one solitary, 5–10 cm long; spikelets in triplets, 1.5–1.8 mm long; lower glume minute or absent, upper glume from slightly shorter than to as long as spikelet, 3–5-nerved, with short crinkled hairs between nerves; lower floret with lemma as long as or slightly shorter than spikelet, glabrous or with crinkled hairs between nerves; upper floret as long as or slightly shorter than spikelet.

Native of tropical Asia and America; naturalized and widespread in the Moreton, Wide Bay, eastern Darling Downs and eastern Burnett districts; common in the Moreton district. Often a weed in disturbed areas.

9. *Digitaria longiflora* (Retz.) Pers.

Paspalum longiflorum Retz.; *P. brevifolium* Fluegge; *P. brevifolium* var. *propinquum* (R. Br.) Benth.; *Digitaria propinqua* (R. Br.) Beauv.; *D. tenuiflora* (R. Br.) Beauv.; *D. curvipes* Meg.; *D. eriolepis* Henrard; *D. speciosa* Henrard

Annual or perennial, ascending, up to 60 cm tall; culms branching, nodes glabrous. Leaf sheaths ± hairy in lower parts of plants, glabrous above; ligules membranous, 1–2 mm long; leaf blades linear to narrowly ovate, apex acuminate, 1–20 cm × 0.2–0.5 cm, glabrous or with few soft hairs. Inflorescences of 2 or 3 racemes, digitate, racemes 3–10 cm long; spikelets 1.3–2.3 mm long, lower glume minute or absent, upper glume *ca* as long as spikelet, 3–5-nerved, pubescent between nerves; lower floret with lemma as long as spikelet, 7-nerved, pubescent between nerves; upper floret with lemma *ca* as long as spikelet.

Widespread throughout the region in a variety of habitats.

10. *Digitaria bicornis* (Lam.) Roemer & Schultes

Paspalum bicornis Lam.; *Digitaria ciliaris* (Retz.) Koeler subsp. *chrysoblephora* S. T. Blake; *D. queenslandica* Henrard

Annual, tufted at first, later decumbent, up to 60 cm tall, rooting at nodes; culms not or sparsely branched, nodes glabrous. Leaf sheaths glabrous to pilose; ligules membranous, 1–3.5 mm long; leaf blades linear, narrowing upwards, 2.5–15 cm × 0.2–0.9 cm, glabrous except for some hairs in throat, rarely pilose. Inflorescences of 2–5 racemes, rarely more, digitate or occasionally in 2 or 3 whorls along common axis, racemes 3–15 cm long; spikelets in pairs, spikelets of each pair usually different, sessile one glabrous to slightly pubescent, pedicellate one pubescent and with bristles, occasionally both pubescent and with bristles, all spikelets 2.75–3.5 mm long; lower glume less than 1 mm long or absent, upper glume $\frac{1}{3}$ – $\frac{4}{5}$ length of spikelet, 3-nerved; lower floret with lemma as long as spikelet, lower lemma of sessile spikelet usually glabrous or slightly hairy and without

bristles or pubescent and with bristles, lower lemma of pedicellate spikelet pubescent and with bristles, bristles indistinct and appressed; upper floret slightly shorter than spikelet.

Known from a few places in the Moreton and Wide Bay districts.

11. **Digitaria didactyla* Willd.

QUEENSLAND BLUE COUCH

Panicum didactylum (Willd.) Kunth; *P. sanguinale* L. var. *brevispicatum* Maiden

Perennial developing long stolons, rooting at nodes, shoots and flowering culms developing from stolons; culms up to 40 cm tall, unbranched or sparingly branched, nodes glabrous. Leaf sheaths densely to sparsely pilose, sometimes glabrescent; ligules membranous, *ca* 1 mm long; leaf blades linear, apex narrowed, 1–9 cm × 0.1–0.3 cm, sometimes broader in cultivated material, usually glabrous. Racemes 2 or 3, rarely 4, digitate, 2–7 cm long; spikelets in pairs, 2.3–2.75 mm long; lower glume minute, upper glume $\frac{1}{2}$ – $\frac{2}{3}$ length of spikelet, 3-nerved with fine hairs on margin and sometimes also on back; lower floret with lemma as long as spikelet, 7-nerved, with fine hairs on margin and often on back; upper floret slightly shorter than spikelet, glabrous.

Apparently native of the Mascarene Is but now widespread in the tropics; apparently established in Australia in the early 19th century, widespread in eastern parts of the region in areas not subjected to heavy frosts or droughts. It is a major lawn grass in coastal south-eastern Queensland.

12. **Digitaria heterantha* (J. D. Hook.) Merr.

Paspalum heteranthum J. D. Hook.

Perennial, tufted, erect, up to *ca* 60 cm tall; culms branched or unbranched, nodes glabrous. Leaf sheaths ± glabrous or with sparse tubercular-based hairs; ligules membranous, 0.7–1.2 mm long; leaf blades linear or linear-ovate, apex attenuate, 2–9.5 cm × 0.2–0.5 cm, glabrous or with tubercular-based hairs towards base, minutely scabrous. Inflorescences of 2 or 3 digitate racemes, each raceme 2–9 cm long; spikelets in pairs, 3–3.6 mm long; lower glume less than 0.5 mm long, upper glume $\frac{2}{3}$ – $\frac{3}{4}$ length of spikelet, 3-nerved, silky pubescent; lower floret with lemma as long as spikelet, pubescent to glabrous, ± scabrous along at least $\frac{1}{2}$ length of lateral nerves; upper floret with lemma ± as long as spikelet, glabrous.

Recorded from Chinchilla in the western Darling Downs district.

13. **Digitaria eriantha* Steudel

Perennial, rhizomatous or stoloniferous, ± erect, up to *ca* 1 m tall; culms simple or with few branches, nodes glabrous. Leaf sheaths glabrous except lower ones, sometimes hairy at base; ligules membranous, up to 5 mm long; leaf blades linear, apex attenuate, 8–20 cm × 0.15–0.4 cm, rarely longer, glabrous or with few hairs, scabrous. Inflorescences of 3–12 racemes, digitate or subdigitate with axis up to 3 cm long, racemes 6–15 cm long; spikelets paired, rarely 3 together, 3–3.5 mm long; lower glume up to 0.5 mm long, upper glume *ca* $\frac{2}{3}$ length of spikelet, 3-nerved, with dense fine hairs between nerves and on margin; lower floret with lemma as long as spikelet, 7-nerved with dense fine hairs between nerves and on margin; upper floret with lemma ± as long as spikelet.

Two subspecies occur in the region:

- | | | | | | | | | |
|--------------------------------|---|---|---|---|---|---|---|---|
| 1. Plants with woolly rhizomes | . | . | . | . | . | . | . | <i>D. eriantha</i> subsp. <i>eriantha</i> |
| Plants with glabrous stolons | . | . | . | . | . | . | . | <i>D. eriantha</i> subsp. <i>pentzii</i> |

Both *D. eriantha* subsp. *eriantha*, WOOLLY FINGERGRASS and *D. eriantha* subsp. *pentzii* (Stent) Kok (*D. pentzii* Stent; *D. decumbens* Stent), PANGOLA GRASS are native of southern Africa and both have been reported apparently naturalized in a few places in the region.

14. **Digitaria ciliaris* (Retz.) Koeler

SUMMERGRASS

Panicum ciliare Retz.; *Digitaria adscendens* (Kunth) Henrard

Variable annual, stoloniferous, decumbent to ascending, rooting at nodes, up to *ca* 1 m tall but usually much less; culms branched or unbranched, nodes glabrous or with few hairs. Leaf sheaths ± glabrous or with sparse tubercular-based hairs; ligules membranous, 1–2 mm long; leaf blades linear or linear-ovate, apex narrowed, 5–15 cm × 0.4–0.8 cm, glabrous or sparsely hairy at base. Inflorescences of 4–9 racemes, digitate or

subdigitate, racemes mostly 3–15 cm long, sometimes longer; spikelets in pairs, 2.6–3.5 mm long; lower glume less than 0.5 mm long, upper glume $\frac{1}{2}$ – $\frac{3}{4}$ length of spikelet, 3-nerved, usually with at least few hairs; lower floret with lemma as long as spikelet, 7-nerved, silky pubescent at least along margin, sometimes also with tubercular-based hairs; upper floret with lemma *ca* as long as spikelet, glabrous. **Fig. 37M.**

Widespread in tropical parts of the world; naturalized and widespread in the region. It is a weed of disturbed areas.

15. *Digitaria brownii* (Roemer & Schultes) Hughes

COTTON PANIC

Panicum brownii Roemer & Schultes; *Digitaria brownii* var. *monostachya* (Benth.) Hughes; *P. leucophaeum* auct. non Kunth, Benth.

Perennial, shortly rhizomatous, \pm tufted, \pm erect, up to 60 cm tall; culms branched or unbranched, nodes glabrous. Sheaths glabrous or with sparse tubercular-based hairs; ligules membranous, 1–4 mm long; leaf blades linear, apex narrowed, 4–16 cm \times 0.15–0.5 cm, glabrous or with few tubercular-based hairs. Inflorescences panicles of 1–7 racemes borne singly or 2 together on common axis, racemes mostly 3–12 cm long, rarely longer; spikelets usually in pairs, pedicellate, 2.5–3.5 mm long excluding indumentum, usually enveloped in long fine silky hairs; lower glume up to $\frac{1}{3}$ length of spikelet, 1-nerved or nerveless, upper glume as long as spikelet, 3–5-nerved, with long dense silky hairs; lower floret with lemma as long as spikelet, 5-nerved, with long dense silky hairs; upper floret with lemma slightly shorter than spikelet, glabrous. **Fig. 37K.**

Widespread and moderately common in the Darling Downs district and also recorded from the Burnett and Moreton districts, often in open woodland communities.

16. *Digitaria baileyi* (Benth.) Hughes

Panicum baileyi Benth.

Perennial, erect, up to *ca* 60 cm tall; culms branched, lower nodes retrorsely villous, upper nodes glabrous. Leaf sheaths glabrous or lower ones with few hairs; ligules short; leaf blades linear, 1.5–7 cm \times 0.15–0.3 cm, glabrous. Inflorescences panicles of several racemes, rachis of panicle *ca* 2–3 cm long, racemes 5–10 cm long; spikelets mostly in pairs, *ca* 2.5 mm long; lower glume *ca* 0.5 mm long, upper glume as long as spikelet, 3-nerved, pubescent between nerves; lower floret with lemma as long as spikelet, 5-nerved, pubescent between nerves; upper floret with lemma slightly shorter than spikelet. **Fig. 37L.**

Known from the vicinity of Brisbane.

17. *Digitaria breviglumis* (Domin) Henrard

Panicum breviglume Domin; *Digitaria diminuta* Hughes; *D. fumida* S. T. Blake

Perennial, erect, loosely tufted, up to 70 cm tall; culms unbranched or sparsely branched, nodes glabrous. Leaf sheaths with sparse hairs; ligules membranous, 2–4 mm long; leaf blades linear, apex narrowed, 3–15 cm \times 0.1–0.3 cm, with sparse to moderately dense hairs. Inflorescences panicles of racemes, rachis of panicle 1–8 cm long, racemes 2–10 cm long; spikelets mostly in pairs, *ca* 1.3–1.9 mm long; lower glume 0.16–0.4 mm long, upper glume $\frac{1}{4}$ – $\frac{1}{3}$ as long as spikelet, rarely somewhat longer, usually nerveless, glabrous; lower floret with lemma \pm equal to spikelet or slightly shorter; upper floret with lemma as long as spikelet.

Widespread in the region except the Burnett district, often in open woodland communities.

18. *Digitaria orbata* Hughes

Perennial, loosely tufted, erect, up to 70 cm tall; culms branched or unbranched, nodes glabrous. Leaf sheaths with few hairs; ligules membranous, 1.5–4 mm long; leaf blades linear, apex attenuate, 3–25 cm \times 0.15–0.5 cm long, glabrous or with sparse to dense fine hairs. Inflorescences panicles of 2–10 racemes, racemes arranged singly or rarely 2 together along common axis up to 8 cm long, each raceme 2–10 cm long; spikelets mostly in pairs, 1.3–1.8 mm long; lower glume absent or minute, upper glume $\frac{1}{8}$ – $\frac{1}{3}$ length of



Fig. 37 POACEAE — spikelets, all $\times 9$; A–B *Entolasia* spp. — A *E. stricta*; B *E. whiteana*; C *Eriochloa pseudoacrotricha*, front and back views; D *Ottochloa gracillima*; E *Alloteropsis semialata*, front and back views; F *Calyptochloa gracillima*, front and back views; G *Homopholis belsonii*; H–M *Digitaria* spp. — front and back views; H *D. hystrichoides*; I *D. tonsa*; J *D. sanguinalis*; K *D. brownii*; L *D. baileyi*; M *D. ciliaris*.

spikelet, nerveless, glabrous; lower floret with lemma slightly shorter than spikelet, glabrous or with few fine hairs; upper floret as long as spikelet, papillate.

Western parts of the region, often on sandy soils, also known from the Glasshouse Mts in the Moreton district.

19. *Digitaria diffusa* Vickery

Perennial, slender, decumbent, rooting at nodes, up to ca 40 cm tall; culms branched, nodes glabrous or sparsely hairy. Leaf sheaths sparsely hairy or glabrous; ligules membranous, 1–2 mm long; leaf blades linear or linear-ovate, apex acute-acuminate, 1.5–8 cm × 0.08–0.3 cm, sparsely hairy or glabrous. Inflorescences panicles of 2–7 racemes borne singly or two together along axis, racemes 3–7 cm long; spikelets usually in pairs, occasionally few solitary, ca 1.5–2 mm long; lower glume 0.14–0.5 mm long, nerveless, upper glume ± as long as spikelet, 3-nerved, usually with lines of hairs between nerves, at length hairs ± spreading; lower floret with lemma as long as spikelet, 5–7-nerved, with hairs appressed at first, later ± spreading; upper floret with lemma ca as long as spikelet, glabrous.

Widespread in the Moreton and Darling Downs districts, also recorded from the Burnett district, usually in open forests or woodlands.

20. *Digitaria minima* R. Webster

Perennial, tufted, erect, up to 40 cm tall; culms branched or unbranched, nodes glabrous. Leaf sheaths glabrous; ligules membranous, 0.5–0.75 mm long; leaf blades linear or linear-ovate, apex acuminate, 0.7–6 cm × 0.1–0.2 cm, glabrous. Inflorescences panicles of 1–3 racemes, racemes 0.7–3.5 cm long; spikelets 1.2–1.5 mm long; lower glume up to 0.2 mm long, upper glume $\frac{3}{4}$ – $\frac{5}{8}$ length of spikelet, 3-nerved, pubescent; lower floret with lemma somewhat shorter than spikelet, 3–7-nerved, glabrous; upper floret as long as spikelet.

Known in the region from Mt Coot-tha in Brisbane.

21. *Digitaria ramularis* (Trin.) Henrard

Panicum ramulare Trin.; *P. tenuissimum* auct. non Schrank, Benth.; *Digitaria tenuissima* Hughes

Perennial, loosely tufted, erect, up to 70 cm tall; culms unbranched or slightly branched, nodes glabrous or pubescent. Leaf sheaths villous or hirsute but sometimes glabrescent; ligules membranous, 1.5–3 mm long; leaf blades linear, apex attenuate, 2.5–25 cm × 0.15–0.55 cm, pubescent or glabrous. Inflorescences panicles of 3–10 racemes exerted singly along axis 3–10 cm long, racemes 4–13 cm long; spikelets 1.5–2 mm long; lower glume less than 0.5 mm long, upper glume ca $\frac{1}{2}$ – $\frac{3}{4}$ length of spikelet, 3-nerved, glabrous or pubescent; lower floret with lemma somewhat shorter than spikelet, glabrous or rarely with few hairs on margin; upper floret with lemma as long as spikelet.

Widespread and moderately common in the region in a variety of habitats.

22. *Digitaria parviflora* (R. Br.) Hughes

SMALLFLOWER FINGERGRASS

Panicum parviflorum R. Br.; *P. parviflorum* var. *pilosa* Benth.; *P. steudelium* Domin var. *striatum* Domin; *Digitaria striata* Hughes; *D. patula* Henrard

Perennial, loosely tufted, erect, up to 1.5 m tall; culms unbranched or few-branched, nodes glabrous. Leaf sheaths glabrous or sparsely to densely hairy; ligules membranous, 2–4 mm long; leaf blades linear, apex attenuate, 15–30 cm × 0.2–0.5 cm, glabrous. Inflorescences panicles of numerous racemes, racemes arranged singly or 2–4 together along common axis up to 10 cm long, each raceme 6–15 cm long; spikelets mostly in pairs, 1.6–2.1 mm long; lower glume up to ca 0.6 mm long, upper glume as long as or slightly shorter than spikelet; 3–5-nerved, glabrous or with few hairs on margin; lower floret with lemma as long as or slightly shorter than spikelet, glabrous or with few hairs on margin; upper floret with lemma as long as or slightly shorter than spikelet.

Widespread and common in the region.

Digitaria oraria R. Webster was collected from Bundaberg in the Wide Bay district in 1938 but apparently has not persisted. It is an annual species with spikelets three or more together on primary branches.

91. PENNISETUM Rich.

Annuals or perennials, tufted or stoloniferous. Ligules usually reduced to ciliate rim; leaf blades flat, folded or convolute. Inflorescences spike-like panicles, solitary or fascicled, usually dense, occasionally reduced; spikelets solitary or in clusters of 2–5 or more, each spikelet or cluster of spikelets subtended by 1–many slender bristles; spikelets with 2 florets, lower floret sterile or male, rarely bisexual, upper bisexual or sometimes male in lateral spikelets of cluster; lower glume shorter than spikelet, sometimes suppressed, 0–3-nerved, upper glume from very small to as long as spikelet, 0–9-nerved; lower floret with lemma as long as or shorter than spikelet, 3–13-nerved or in sterile florets sometimes reduced to minute scale, palea as long as or shorter than lemma or absent; upper floret as long as or slightly shorter than spikelet, mostly 5–7-nerved, palea \pm equal to lemma; stamens 3; styles distinct.

About 70 species, tropical and subtropical parts of the world; 13 species Australia; 8 species south-eastern Queensland.

- | | | |
|--|----------------------------|---|
| 1. Inflorescences reduced to a cluster of 2–4 spikelets concealed in uppermost leaf sheaths | 1. <i>P. clandestinum</i> | 2 |
| Inflorescences cylindrical spike-like panicles exerted from leaf sheaths | | |
| 2. Involucres surrounding spikelets arising on top of a stalk 1–5 mm long | | 3 |
| Involucres surrounding spikelets subsessile | | 6 |
| 3. Involucral bristles not conspicuous, scarcely exerted beyond inflorescence | 2. <i>P. glaucum</i> | |
| Involucral bristles conspicuous, long exerted beyond inflorescence | | 4 |
| 4. Involucral bristles not plumose | 3. <i>P. alopecuroides</i> | |
| Involucral bristles plumose | | 5 |
| 5. Spikelets 0.9–1.4 cm long | 4. <i>P. villosum</i> | |
| Spikelets 0.45–0.65 cm long | 5. <i>P. setaceum</i> | |
| 6. Rachis of inflorescence densely pubescent; plants forming bamboo-like clumps 1–7 m tall | 6. <i>P. purpureum</i> | |
| Rachis of inflorescence glabrous or scabrous; slender plants not forming bamboo-like clumps, up to 1 m tall | | 7 |
| 7. Upper glumes as long as spikelets; lemma of lower floret slightly shorter than spikelet; panicles 3–25 cm long | 7. <i>P. polystachion</i> | |
| Upper glumes up to $\frac{1}{4}$ length of spikelets; lemma of lower floret $\frac{1}{3}$ – $\frac{2}{3}$ length of spikelet; panicles 2–5 cm long | 8. <i>P. thunbergii</i> | |

1. **Pennisetum clandestinum* Hochst. ex Chiov.**KIKUYU GRASS**

Perennial with numerous rhizomes and numerous stolons rooting at nodes, forming close mat, mostly up to *ca* 30 cm tall; culms branched, rooting at nodes, nodes glabrous. Leaf sheaths usually with fine tubercular-based hairs or sometimes glabrous; ligules a ciliate rim; leaf blades linear, at first folded then flattening out, long tapering to apex, base gradually passing into sheath, mostly 1–30 cm \times 0.3–0.7 cm, glabrous or with sparse to dense tubercular-based hairs. Inflorescences on short shoots in axils of sheaths, usually a cluster of 2–4 spikelets, rarely inflorescences spike-like panicles emergent from upper sheaths, involucre sparse, bristles $\frac{1}{3}$ – $\frac{3}{4}$ length of spikelets; spikelets bisexual or functionally unisexual, 1–2 cm long, glabrous; lower glume absent, upper glume 1–3 mm long, occasionally longer; lower floret sterile, lemma as long as spikelet, 8–13-nerved, palea absent; upper floret bisexual or functionally male or female, lemma slightly shorter than spikelet, 2–4-nerved.

Native of tropical eastern Africa; introduced and cultivated as a pasture or lawn species, naturalized and widespread in the region. Dairy cattle grazing lush growths have reportedly been poisoned but under most conditions it is considered safe for grazing.

2. **Pennisetum glaucum* (L.) R. Br.

PEARL MILLET; BULRUSH MILLET

Panicum glaucum L.; *Pennisetum americanum* (L.) Leeke; *Pennisetum typhoides* (Burm.) Stapf & Hubbard

Annual, erect, up to 2.5 m tall; culms branched or unbranched, nodes glabrous. Sheaths usually densely bearded at junction with blade, ciliate on margin, otherwise glabrous or with sparse to dense tubercular-based hairs; ligules a dense fringe of hairs *ca* 3 mm long; leaf blades linear to linear-ovate, flat, apex attenuate, base rounded or cordate, 15–100 cm \times 0.9–5 cm, glabrous or sparsely hairy. Panicles cylindrical, 6–45 cm \times 1.2–4 cm, spikelets in clusters of 1–7 on stalks 1–5 mm long, clusters subtended by involucre of many bristles usually 4–7 mm long, sometimes longer; spikelets 3.5–5 mm long; lower glume 0.5–1.5 mm long, nerveless, upper glume 0.6–2.5 mm long, 0–3-nerved; lower floret male or sterile, lemma from $\frac{1}{3}$ to \pm as long as spikelet, 1–7-nerved, glabrous or ciliate near apex, sometimes also pubescent along margin, palea \pm as long as lemma or absent, sometimes \pm pubescent; upper floret bisexual, lemma as long as spikelet, 5–7-nerved, minutely pubescent, sometimes long ciliate along margin; palea as long as lemma, glabrous or pubescent, sometimes villous on margin.

Native of the Americas, Africa and India; cultivated for grain and forage, occasionally found as an escape from cultivation.

3. *Pennisetum alopecuroides* (L.) Sprengel

SWAMP FOXTAIL

Panicum alopecuroides L.; *Pennisetum compressum* R. Br.

Tufted perennial forming tussocks, erect, up to *ca* 1 m tall; culms unbranched, nodes glabrous. Leaf sheaths glabrous except for few hairs near ligule; ligules less than 1 mm long; leaf blades linear, flat or folded or involute, 10–45 cm \times 0.15–0.6 cm, glabrous or with few long tubercular-based hairs. Panicles cylindrical, 7–30 cm \times 1–2 cm excluding bristles, spikelets solitary, each on stalk 1–4 mm long subtended by involucre of 10–45 bristles, unequal but up to 2–5 times longer than spikelet, outer ones shorter; spikelets 6–8 mm long; lower glume 1–1.3 mm long, upper glume $\frac{1}{3}$ – $\frac{1}{2}$ length of spikelet, 5–7-nerved; lower floret sterile, lemma \pm as long as spikelet, 7-nerved, palea suppressed; upper floret bisexual, lemma \pm as long as spikelet, 5–7-nerved, palea *ca* as long as lemma. **Fig. 38A.**

Widespread in the Moreton and Wide Bay districts, usually near streams or in other damp situations. Sometimes considered a pest in degraded pastures.

4. **Pennisetum villosum* R. Br. ex Fresen.

FEATHERTOP; WHITE FOXTAIL

Pennisetum longistylum auct. non Hochst., Vilm.

Tufted perennial, erect or ascending, up to 75 cm tall, cultivated plants sometimes taller; culms simple or branched, nodes glabrous. Leaf sheaths glabrous or with sparse to moderately dense tubercular-based hairs, bearded at throat, margin usually ciliate; ligules a ciliate rim; leaf blades linear, flat or folded, apex tapering, base not or scarcely narrowed, 6–30 cm \times 0.2–0.6 cm, larger in cultivated plants, glabrous or with few tubercular-based hairs above, sometimes scabrous. Panicles cylindrical, 2–20 cm \times 1–2 cm excluding bristles, spikelets solitary or rarely in clusters of 2–4, on stalk up to 2 mm long, surrounded by involucre of numerous bristles mostly up to 5 cm long, occasionally longer, at least inner bristles plumose; spikelets 0.9–1.4 cm long; lower glume absent or up to 1 mm long, upper glume 3.5–6 mm long, 1–3-nerved; lower floret male or sterile, lemma \pm equal to spikelet, 7–11-nerved, scabrous, palea shorter than lemma or absent; upper floret bisexual, lemma as long as floret, 5–7-nerved, palea as long as lemma.

Native of northern Africa and Arabia; cultivated as an ornamental in some parts of Australia, naturalized in the Moreton, Darling Downs and Burnett districts. Weed of footpaths and vacant land in some parts of the region.

5. **Pennisetum setaceum* (Forssk.) Chiov.

FOUNTAIN GRASS

Phalaris setacea Forssk.

Tufted perennial, erect or ascending, up to *ca* 1 m tall; culms sometimes branched near base, nodes glabrous. Leaf sheaths \pm glabrous except for cilia on margin; ligules a ciliate rim; leaf blades linear, convolute, folded or flat, apex tapered, mostly 8–30 cm \times 0.05–0.3 cm, glabrous or with few hairs towards base, scabrous above and on margin.

Panicles cylindrical, 10–25 cm \times 1.2–1.6 cm excluding bristles, spikelets 1–3 in cluster on stalk 1–3 mm long, cluster enclosed by involucre of numerous bristles mostly up to 2.6 cm long with one up to 4 cm long, plumose; spikelets 4.5–6.5 mm long; lower glume absent or up to $\frac{1}{3}$ length of spikelet, upper glume $\frac{1}{4}$ – $\frac{2}{3}$ length of spikelet, 1-nerved; lower floret sterile or male, lemma \pm as long as spikelet, 1–5-nerved, scabrous on nerves, palea absent or up to as long as lemma; upper floret bisexual or male, lemma as long as spikelet, with mucro up to 1 mm long, 5-nerved, scabrous towards apex, occasionally margin ciliate, palea slightly shorter than lemma.

Native of drier parts of northern and eastern Africa and south-western Asia; cultivated to a limited extent as an ornamental grass, naturalized in the Moreton district in rocky or stony areas.

6. **Pennisetum purpureum* Schumacher

ELEPHANT GRASS

Robust perennial, erect, often forming bamboo-like clumps, 1–7 m tall; culms simple, nodes glabrous or with appressed hairs. Leaf sheaths glabrous or with sparse to dense tubercular-based hairs in upper part; ligules a rim of cilia up to 4 mm long; leaf blades linear, apex long tapering, base scarcely narrowed, 30–120 cm \times 0.5–4 cm, upper surface \pm hairy with tubercular-based hairs, margin spinulose-scabrous. Panicles cylindrical, 7–30 cm \times 1.4–3 cm excluding bristles, spikelets 1–5, \pm sessile, surrounded by involucre of numerous bristles mostly 1–1.6 cm long but one bristle longer and 1.2–4 cm long; spikelets 4.5–7 mm long, glabrous; lower glume absent or minute, upper glume minute or up to $\frac{1}{2}$ length of spikelet, 1-nerved or nerveless; lower floret male or sterile, lemma from very short to as long as spikelet, palea shorter than lemma or absent, 1–3-nerved, rarely 3–7-nerved; upper floret bisexual or male, lemma as long as floret, 5–7-nerved, palea shorter than lemma.

Native of tropical Africa; introduced as a forage plant, naturalized in the Moreton and Wide Bay districts. It is a weed of roadsides.

7. **Pennisetum polystachion* (L.) J. A. Schultes

MISSION GRASS

Panicum polystachion L.

Annual or perennial, erect or ascending, up to *ca* 1 m tall; culms branched, nodes glabrous. Leaf sheaths glabrous or almost so; ligules a line of cilia, *ca* 1.5–2 mm long; leaf blades linear, apex long attenuate, base rounded or contracted, 10–40 cm \times 0.3–1.6 cm, glabrous or with few hairs at base. Panicles cylindrical, 3–25 cm \times 0.6–1.2 cm excluding bristles, spikelets solitary, \pm sessile, surrounded by involucre of many bristles, longest up to 2.5 cm long, ciliate or plumose in lower part; spikelets 2–5 mm long; lower glume minute or absent, upper glume as long as spikelet, apiculate, glabrous, 5–7-nerved; lower floret male or sterile, lemma slightly shorter than spikelet, 3-lobed, palea up to *ca* slightly shorter than lemma or absent; upper floret bisexual, lemma *ca* as long as spikelet, palea *ca* 2–3 mm long.

Native of tropical Africa, Asia and America; naturalized in the Moreton district but not common, probably also in the Wide Bay district.

8. **Pennisetum thunbergii* Kunth

Pennisetum glabrum Steudel

Loosely tufted perennial, erect or ascending, up to *ca* 60 cm tall; culms usually unbranched, nodes glabrous. Leaf sheaths glabrous or hairy near margin and throat; ligules reduced to a ciliolate rim; leaf blades linear, apex long tapering, base gradually passing into sheath, 3–40 cm \times 0.2–0.8 cm, glabrous or sparsely hairy at base. Panicles cylindrical, 2–5 cm \times 0.4–0.8 cm, spikelets solitary, sessile, surrounded by involucre of 5–10 bristles, 1 or 2 longer than others and up to 1.4 cm long; spikelets 2.5–5 mm long; lower glume absent or up to 1 mm long, nerveless, upper glume up to *ca* $\frac{1}{4}$ length of spikelet, nerveless or 1-nerved; lower floret sterile, lemma $\frac{1}{3}$ – $\frac{2}{3}$ length of spikelet, with aristate tip up to *ca* 1.5 mm long, 1–3-nerved, palea absent; upper floret bisexual, lemma as long as spikelet, with acuminate tip or with aristate tip up to 1 mm long, palea as long as lemma.

Native of tropical Africa; recorded as apparently naturalized in the Moreton and Wide Bay districts; rare.

92. CENCHRUS L.

Annuals or perennials. Ligules reduced to ciliate rim; leaf blades flat, folded or involute. Inflorescences terminal spike-like panicles or racemes, spikelets 1–5 together, enclosed by an involucre of bristles, bases of bristles at least partly united or bristles fused and thickened to form burr-like structure; spikelets with 2 florets, lower floret male or sterile and reduced to lemma, upper floret bisexual; glumes subequal or lower small or suppressed, lower 1–3-nerved, upper as long as spikelet, 1–7-nerved; lower floret with lemma *ca* as long as spikelet, 3–7-nerved, palea up to as long as lemma or suppressed; upper floret with lemma as long as spikelet, 5–7-nerved, palea as long as lemma; stamens 3; styles free or connate near base.

About 30 species mainly from warm dry regions of America and Africa with others in India, south-western Asia, Australia and Polynesia; 10 species Australia; 5 species south-eastern Queensland.

- | | | | | | | |
|---|---|---|---|---|--------------------------|---|
| 1. Involucral bristles or spines antrorsely barbed | . | . | . | . | 1. <i>C. ciliaris</i> | |
| Involucral bristles or spines retrorsely barbed | . | . | . | . | . | 2 |
| 2. Involucre of bristles connate at base only | . | . | . | . | 2. <i>C. caliculatus</i> | |
| Involucre of spines connate for more than $\frac{1}{3}$ distance from base, sometimes subtended by bristles | . | . | . | . | . | 3 |
| 3. Burrs of 1 whorl of united flattened spines subtended by smaller finer bristles | . | . | . | . | 3. <i>C. echinatus</i> | |
| Burrs of more than 1 whorl of flattened spines without subtending bristles | . | . | . | . | . | 4 |
| 4. Burrs cleft on 1 side only; spines mostly more than 50; florets 6 mm or more long | . | . | . | . | 4. <i>C. longispinus</i> | |
| Burrs cleft on 2 sides; spines usually less than 45; spikelets less than 6 mm long | . | . | . | . | 5. <i>C. incertus</i> | |

1. **Cenchrus ciliaris* L.

BUFFEL GRASS

Perennial, ascending or erect, up to 90 cm tall; culms branched, nodes glabrous or with few hairs. Leaf sheaths glabrous or with sparse tubercular-based hairs; ligules a dense ciliate rim; leaf blades linear, flat, long tapering, 7–30 cm × 0.2–0.8 cm, glabrous or with sparse tubercular-based hairs. Panicles up to 15 cm long; involucre of bristles on stalk *ca* 1 mm long, bristles unequal, up to 1.6 cm long, connate at base, antrorsely barbed, ± densely hairy in lower part; spikelets solitary or 2 or 3 together in involucre, 3.5–5 mm long. **Fig. 38B.**

Native of Africa, south-western Asia and India; introduced as a pasture grass, naturalized in western parts of the region and occasionally found in more easterly parts. The species is palatable to stock.

2. *Cenchrus caliculatus* Cav.

HILLSIDE BURRGRASS

Cenchrus australis R. Br.

Robust perennial, scrambling and forming clumps or ± prostrate, often rooting at lower nodes; culms branching, nodes glabrous. Leaf sheaths glabrous or pilose on margin or occasionally all over; ligules a dense ciliate rim; leaf blades linear-ovate, flat or somewhat folded, tapering to pungent tip, 14–60 cm × 0.3–2 cm, glabrous or with few hairs, scabrous. Panicles up to 24 cm long; involucre burr-like, 0.5–1.1 cm long, on stalk 1–3 mm long, spines usually ± erect, unequal in length, retrorsely barbed, lower margin densely hairy; spikelets solitary or rarely 2 or 3 together in involucre, 4–6(–9) mm long, shorter than inner spines of involucre.

Widespread throughout the region, usually on poorer soils. It is of little value as fodder and the burrs can be a nuisance in wool and in clothing.

3. **Cenchrus echinatus* L.

MOSSMAN RIVER GRASS

Annual, ascending, up to *ca* 90 cm tall but mostly less than 60 cm tall; culms branching, nodes glabrous. Leaf sheaths glabrous or hairy on margin or rarely all over; ligules a dense ciliate rim; leaf blades linear-ovate, flat, tapering to pungent point, 5–25 cm × 0.3–1.2 cm, glabrous to pubescent below, sparsely hairy above. Panicles up to 10 cm long; involucre burr-like, 4–10 mm long, sessile, spines rigid, unequal in length, retrorsely

barbed, inner ones flattened and fused for *ca* $\frac{1}{2}$ their length, pubescent, ciliate on margin; spikelets in clusters of 2 or 3, rarely more, 4.5–7 mm long. **Fig. 38D.**

Native of Central America and southern United States of America; naturalized and widespread in the region. Often found as a weed of footpaths, cultivation and other disturbed sites.

4. **Cenchrus longispinus* (Hackel) Fernald

SPINY BURRGRASS

Cenchrus pauciflorus Benth. pro parte

Annual, often forming spreading clumps, decumbent to erect, up to *ca* 90 cm tall; culms branched, nodes glabrous. Leaf sheaths glabrous except margin and throat pilose; ligules ciliate, 0.7–1.7 mm long; leaf blades \pm linear, flat or occasionally folded or involute, apex attenuate, 3–19 cm \times 0.3–0.7 cm, scabrous to sparsely pilose, lower surface sometimes smooth and glabrous. Panicles up to 10 cm long; involucre burr-like, 0.8–1.2 cm long, pubescent in lower part, on stalks 1–5 mm long, spines usually 40–70, retrorsely barbed, united in lower part but cleft on one side; spikelets usually 2 or 3 in each involucre, 6–8 mm long. **Fig. 38C.**

Native of North and Central America; naturalized and widespread but not common in the region except the Wide Bay district. It is considered a pest because of its large sharp burrs.

5. **Cenchrus incertus* M. A. Curtis

SPINY BURRGRASS

Cenchrus pauciflorus Benth. pro parte

Annual or occasionally biennial, forming clumps, decumbent to erect, up to *ca* 80 cm tall; culms branched, nodes glabrous. Leaf sheaths glabrous or sparsely pilose, margin and throat glabrous to pilose; ligules ciliate, 0.5–1.5 cm long; leaf blades \pm linear, flat or folded, apex attenuate, 2–18 cm \times 0.2–0.6 cm, glabrous, scabrous on margin and upper surface. Panicles up to *ca* 9 cm long; involucre burr-like, 5.5–10 mm long, usually pubescent in lower part, on stalk 0.5–2 mm long, spines usually 8–45, retrorsely barbed, united in lower part but cleft on two sides; spikelets 2–4 in each involucre, 3.5–5.5 mm long.

Native of tropical America; naturalized in the Darling Downs district. It is considered a pest because of its large sharp burrs.

93. RHYNCHELYTRUM Nees

Annuals or perennials. Ligules reduced to a ciliate rim; leaf blades flat or folded. Inflorescences compound panicles, pedicels capillary; spikelets usually asymmetrical, florets 2, lower usually male, upper bisexual; glumes unequal, lower glume small, often distant from upper glume, upper glume \pm as long as spikelet, 5-nerved, rarely 7-nerved, \pm gibbous below middle, emarginate to bilobed, mucronate or awned from sinus; lower floret with lemma similar to upper glume or somewhat narrower and less gibbous, palea linear and subequal to lemma or shorter than lemma, rarely absent; upper floret with lemma shorter than spikelet, 3–5-nerved, palea subequal to lemma, 2-nerved; stamens 3; styles distinct.

About 15 species mostly confined to Africa; 1 species naturalized Australia, occurring in south-eastern Queensland.

1. **Rhynchelytrum repens* (Willd.) C. E. Hubbard

RED NATAL GRASS

Saccharum repens Willd.; *Tricholaena teneriffae* auct. non (L. f.) Link, F. M. Bailey

Annual or perennial, tufted, erect or ascending, up to *ca* 1 m tall, often rooting at lower nodes; culms simple or branched. Leaf sheaths glabrous or pubescent; ligules up to 2 mm long; leaf blades linear, flat or folded, 5–30 cm \times 0.2–1 cm, glabrous or pubescent. Panicles 5–20 cm \times 2–10 cm, pedicels 1–10 mm long, with few long hairs at apex; spikelets 2.5–6 mm long, with silvery-white to pink or purplish hairs exceeding spikelet by 1–4 mm; lower glume well separated from upper glume, 0.4–1.5 mm long, densely bearded at base, upper glume as long as spikelet, mucronate or with awn up to 4 mm long, with dense silky hairs; lower floret with lemma similar to upper glume but less gibbous, palea present; upper floret with lemma 2–2.5 mm long, often deciduous before remainder of spikelet. **Fig. 38E.**

Native of Africa; naturalized and widespread in the region, common in coastal parts. Often a weed of roadsides and other disturbed sites.

94. MELINIS Beauv.

Annuals or perennials. Ligules reduced to a ciliate rim; leaf blades flat. Inflorescences panicles; spikelets usually symmetrical in profile, florets 2, lower usually sterile, upper bisexual; lower glume small or suppressed, never distant from upper glume, upper glume as long as spikelet, 7-nerved, emarginate or bilobed, sometimes awned from sinus; lower floret with lemma \pm as long as spikelet, usually awned, palea usually absent; upper floret with lemma slightly shorter than or as long as spikelet, often deciduous before remainder of spikelet, palea \pm as long as spikelet.

11 species, Africa; 1 species naturalized in Australia, occurring in south-eastern Queensland.

1. **Melinis minutiflora* Beauv.**MOLASSES GRASS**

Perennial, ascending, up to 1 m tall; culms usually unbranched. Leaf sheaths with dense viscid hairs; leaf blades linear, 5–20 cm \times 0.3–1.1 cm, with dense viscid hairs which give the plants a distinctive odour. Panicles usually 10–30 cm long; spikelets often purplish, 1.5–2 mm long, usually glabrous; lower glume absent or up to 0.5 mm long, upper glume prominently 7-nerved, bilobed, with or without mucro; lower floret with lemma 5-nerved, bilobed, with awn up to 1.5 cm long; upper floret with lemma \pm as long as spikelet. **Fig. 38J.**

Native of tropical Africa; introduced as a pasture plant, naturalized in the Wide Bay and Moreton districts.

95. THYRIDOLEPIS S. T. Blake

Perennials. Ligules reduced to dense line of hairs; leaf blades flat. Inflorescences spike-like racemes; spikelets solitary, spirally arranged, florets 2, lower male or sterile, upper bisexual; glumes dissimilar, lower glume slightly shorter than to as long as spikelet, 7–11-nerved, with ridge on back bearing series of thick bristles, below this a sunken hyaline area extending to base, upper glume as long as spikelet, with series of tubercles on either side along margin, tubercles bearing bristles; lower floret with lemma shorter than spikelet, margin embracing upper floret, 5-nerved, palea up to $\frac{1}{2}$ length of lemma; upper floret with lemma shorter than spikelet but slightly longer than lemma of lower floret, 3–5-nerved, palea as long as lemma, 2-nerved.

3 species endemic in Australia; 2 species south-eastern Queensland.

- | | |
|--|---------------------------|
| 1. Spikelets 1.7–2 mm wide; culms silky hairy below inflorescences | 1. <i>T. mitchelliana</i> |
| Spikelets 1.25–1.5 mm wide; culms not silky hairy below inflorescences | 2. <i>T. xerophila</i> |

1. *Thyridolepis mitchelliana* (Nees) S. T. Blake**MULGA GRASS**

Neurachne mitchelliana Nees

Densely tufted, erect, up to 50 cm tall; culms branched or unbranched, nodes pubescent. Leaf sheaths pubescent, often glabrescent, sometimes also with scattered tubercular-based hairs; ligules less than 1 mm long; leaf blades linear to narrowly ovate, apex acuminate, 2.5–6.5 cm \times 0.25–0.45 cm, sparsely minutely pubescent below and often towards base above, also with tubercular-based hairs on margin and undersurface. Inflorescences 2–3.5 cm \times 0.7–0.9 cm, culms silky hairy below inflorescences; spikelets 4.5–7.5 mm long excluding bristles; lower glume tip often 3-toothed, densely hairy on back and sides except for sunken hyaline basal portion, transverse ridge \pm in middle of glume, with 9–29 bristles each 1.5–3.5 mm long, upper glume usually 3-toothed at apex, 11-nerved, bristles on outer tubercles 2–3.5 mm long, often also with tubercles without bristles, sometimes also with long dense hairs which hide glume; lower floret with lemma shorter than spikelet and lemma of upper floret; upper floret *ca* 3.5 mm long. **Fig. 38F.**

Known in the region from a single collection from north-western Darling Downs district.

2. *Thyridolepis xerophila* (Domin) S. T. Blake

Neurachne xerophila Domin

Densely tufted, \pm erect, up to *ca* 30 cm tall; culms branched or unbranched, lower nodes

pubescent, upper ones often glabrous. Leaf sheaths \pm pubescent, sometimes glabrescent; ligules less than 1 mm long; leaf blades linear or linear-ovate, apex acuminate, 1.3–6 cm \times 0.15–0.4 cm, lower surface minutely pubescent, often with few tubercular-based hairs, upper surface glabrous or with few hairs towards base. Inflorescences 2–3.5 cm \times 0.5–0.8 cm, culms glabrous or sparsely hairy below inflorescences; spikelets 4–5 mm long excluding bristles; lower glume \pm 3-toothed or entire at apex, glabrous or minutely hairy, transverse ridge \pm in middle of glume mostly with 10–13 bristles each 1.2–3 mm long, upper glume entire or minutely 3-toothed at apex, 7–11-nerved, bristles on outer tubercles up to 1.75 mm long, also with tubercles without bristles, glabrous and minutely scabrous or \pm pubescent; lower floret with lemma shorter than spikelet but equal to lemma of upper floret; upper floret 2.7–3.5 mm long. **Fig. 38G.**

Widespread in the Darling Downs district, usually on stony or sandy soils.

96. THUAREA Pers.

Perennial, creeping, mat-forming. Ligules reduced to a rim of hairs; leaf blades \pm flat or incurved. Inflorescences solitary 1-sided racemes, fused to leaf or spathe which is broader in lower part; spikelets solitary, florets 2, lower spikelets with lower floret male or sterile, upper floret female or bisexual, upper spikelets with florets male or lower floret sterile and upper floret male, upper spikelets falling early after anthesis and then leafy structure folding over and enclosing developing fruit of lower spikelets; lower glume absent or reduced to narrow rim, upper glume as long as spikelet; lower floret with lemma *ca* as long as spikelet, palea as long as lemma, bifid; upper floret with lemma shorter than spikelet, palea shorter than lemma; stamens 3; styles distinct.

1 species, seashores in tropical Pacific and Indian Ocean areas, occurring in south-eastern Queensland.

1. *Thuarea involuta* (G. Forster) R. Br. ex Roemer & Schultes

TROPICAL BEACHGRASS

Ischaemum involutum G. Forster; *Thuarea sarmentosa* Pers.

Prostrate, flowering culms arising from creeping stems up to *ca* 12 cm tall, unbranched, nodes glabrous. Leaf sheaths pubescent; ligules short; leaf blades narrowly ovate, apex tapering, 2–15 cm \times 0.5–1 cm, \pm pubescent. Inflorescences *ca* 2 cm long; spikelets *ca* 5 mm long; upper glume 7-nerved, pubescent; lemmas 5-nerved, hairy on back, often towards tip only.

Northern Wide Bay district, on coastal sand-dunes.

97. SPINIFEX L.

Perennials, creeping or tufted, dioecious, vegetatively similar plants differing in sex, male, female or bisexual. Ligules a row of cilia; leaf blades flat to convolute. Male and female or bisexual inflorescences very dissimilar; males globular to hemispherical, consisting of clusters of few-many spike-like racemes subtended by large bract, individual racemes subtended by smaller bracteoles, each raceme with several spikelets, rachis terminating in bristle, spikelets each with 2 florets, glumes unequal or \pm equal, often shorter than spikelet, 3–7-nerved, lemmas of both florets similar, *ca* as long as spikelet, 3–5-nerved, paleas as long as lemmas; female or bisexual inflorescences consisting of reduced spikes each with solitary spikelet near base of rachis and rachis continued as a long scabrid bristle, spikes together forming large globular head, spikelets appressed to rachis, each with 2 florets, glumes \pm unequal, upper \pm as long as spikelet, lower somewhat shorter, 3–9-nerved, lemmas of both florets equal or unequal, 3-nerved or nerveless, paleas *ca* as long as lemmas or palea of lower floret sometimes suppressed.

4 species from seashores from Asia to Australia; 2 species Australia; 1 species south-eastern Queensland.

1. *Spinifex sericeus* R. Br.**BEACH SPINIFEX***Spinifex hirsutus* auct. non Labill.

Stout, with creeping stolons rooting at nodes, flowering culms ascending, often tufted at rooted nodes of stolons, up to *ca* 30 cm tall. Leaf sheaths sparsely to \pm densely pubescent, ciliate on upper margin; ligules up to 7 mm long; leaf blades linear, flat to \pm involute, up to *ca* 35 cm \times 0.7–0.8 cm, densely silky hairy. Male inflorescences \pm hemispherical, 5–7 cm diameter, subtending bracts silky hairy, spike-like racemes 1.5–8 cm long, rachis silky hairy, spikelets 0.8–1.2 cm long, \pm silky hairy, glumes \pm equal or upper slightly longer, 8–10 mm long, lemmas of both florets 5-nerved; female inflorescences large globular heads up to *ca* 30 cm diameter, bristle-like rachis of spikes up to 15 cm long, spikelets 1.2–1.6 cm long, glumes subequal and as long as spikelet or upper shorter, lower 5-nerved, upper 7–9-nerved, lower floret sterile or male, lemma as long as spikelet, palea present or absent, upper floret female or rarely bisexual, lemma as long as spikelet or slightly shorter.

Coastal sand-dunes of the region; common. Of value as a sand binder in beach reclamation work.

98. ISACHNE R. Br.

Annuals or perennials. Ligules reduced to a ciliate rim; leaf blades flat. Inflorescences open or contracted panicles; spikelets solitary, florets 2, lower male or bisexual, upper female or bisexual; glumes equal or upper shorter, $\frac{2}{3}$ to as long as spikelet, lower glume 3–9-nerved, upper glume 5–9-nerved; lower floret with lemma as long as spikelet, 5–7-nerved, palea as long as lemma; upper floret with lemma as long as spikelet or shorter, 5–7-nerved, palea as long as lemma.

About 80 species from tropical and warm temperate parts of the world; 4 species Australia; 1 species south-eastern Queensland.

1. *Isachne globosa* (Thunb.) Kuntze**SWAMP MILLET***Milium globosum* Thunb.; *Isachne australis* R. Br.

Aquatic or semi-aquatic, decumbent or occasionally \pm erect, rooting at nodes; culms up to 70 cm long, branching, nodes tuberculate, glabrous. Leaf sheaths glabrous, except ciliate along one margin and upper part of other; ligules 1.5–3 mm long; leaf blades linear-ovate, apex tapering, 2–12 cm \times 0.3–0.8 cm. Panicles at length spreading, 2–10 cm \times 2–10 cm; spikelets 2–2.5 mm long; lower glume as long as spikelet, 7–9-nerved, upper glume as long as spikelet or slightly shorter, 7–9-nerved; lower floret male, lemma 7-nerved; upper floret female or bisexual, lemma shorter than spikelet, minutely pubescent. **Fig. 38H.**

Widespread in the Moreton, Darling Downs and Wide Bay districts, in wet or swampy areas; not common. It is palatable to stock.

99. IMPERATA Cyr.

Perennials, rhizomatous. Leaves mostly crowded at base; ligules scarious. Inflorescences spike-like or contracted panicles; spikelets paired, florets 2, lower reduced to lemma, upper bisexual; glumes \pm equal, as long as spikelet, 3–9-nerved, enveloped by silky hairs from basal callus and lower portion of glumes; lower floret with lemma shorter than spikelet, hyaline; upper floret with lemma shorter than lemma of lower floret, palea broad, denticulate; stamens 1 or 2; styles connate below.

About 8 species, tropical and warm temperate parts of the world; 1 species Australia, occurring in south-eastern Queensland.

1. *Imperata cylindrica* (L.) Ruschel**BLADY GRASS***Lagurus cylindricus* L.; *Imperata cylindrica* var. *major* (Nees) C. E. Hubbard; *I. arundinacea* auct. non Cyr.

Plants forming tufts from scaly rhizome, erect, up to 1.2 m tall; culms unbranched, nodes usually with ring of silky hairs. Leaf sheaths sometimes hairy in upper part, often bearded at orifice; ligules ciliate at apex; leaf blades stiffly erect, linear or linear-ovate,

flat, apex tapering, 3–100 cm \times 0.2–20 cm, margin minutely toothed. Inflorescences cylindrical spike-like panicles, 3–20 cm \times 0.6–2.5 cm; spikelets 2–6 mm long, concealed by silky hairs 0.9–1.5 cm long.

Widespread throughout the region. Often a serious weed.

100. EULALIA Kunth

Tufted perennials, rarely annuals. Ligules short, densely ciliate; leaf blades flat. Inflorescences of 1–several \pm digitate spike-like racemes; spikelets paired, florets 1 or 2, lower floret reduced to lemma or absent, upper floret bisexual; glumes equal and *ca* as long as spikelet or upper slightly shorter, lower glume usually 2-keeled, rarely awned, upper glume 1–3-nerved, usually awnless; lower floret if present with membranous lemma; upper floret with lemma very short, 2-lobed, awned, palea small or absent; stamens 3; styles distinct or fused.

About 25 species, tropical Asia, Africa and Australia; 4 species Australia; 2 species south-eastern Queensland.

- | | |
|--|-------------------------|
| 1. Racemes more than 5 per inflorescence, with pale silky hairs | 1. <i>E. trispicata</i> |
| Racemes less than 5 per inflorescence, with dark brown silky hairs | 2. <i>E. aurea</i> |

1. *Eulalia trispicata* (Schultes) Henrard

Andropogon trispicatus Schultes; *Pollinia argentea* (Brongn.) Trin.

Perennial, erect, up to 1 m tall; culms unbranched or sparsely branched, nodes glabrous. Leaf sheaths glabrous or with few hairs, bearded at orifice; ligules jagged; leaf blades linear, up to *ca* 45 cm \times 0.2–0.6 cm, glabrous or with few hairs at base. Inflorescences of 6–many, rarely fewer, digitate or subdigitate \pm erect spike-like racemes 4–12 cm long; spikelets 3–4 mm long, pedicels and margins of glumes with pale silky hairs; lower glume as long as spikelet, upper slightly shorter than spikelet; lower floret with lemma slightly shorter than spikelet; upper floret with lemma *ca* $\frac{1}{2}$ as long as spikelet, hyaline, bilobed, sinus with awn *ca* 0.8–1.2 cm long.

Widespread in coastal parts of the region, usually on damp sandy soils.

2. *Eulalia aurea* (Bory) Kunth

SILKY BROWNTOP

Andropogon aureus Bory; *Pollinia fulva* (R. Br.) Benth.; *Eulalia fulva* (R. Br.) Kuntze

Perennial, erect, up to 1 m tall; culms unbranched or with few branches, nodes glabrous or hairy. Leaf sheaths glabrous or with few hairs at base; ligules jagged; leaf blades linear, up to 30 cm \times 0.2–0.4 cm, glabrous or with scattered silky hairs. Inflorescences of 2 or 3 digitate or subdigitate \pm erect spike-like racemes 4–10 cm long; spikelets 4–5 mm long, pedicels and glumes with dark brown silky hairs; lower glume as long as spikelet, upper slightly shorter; lower floret absent or with lemma very small; upper floret with lemma *ca* $\frac{1}{3}$ length of spikelet, bifid, lobes terminating in short hairs, sinus with awn 1–1.2 cm long.

Widespread in the region, common in the Darling Downs district, usually in drier areas. It is palatable to stock.

101. ISCHAEMUM L.

Perennials, occasionally annuals. Ligules membranous; leaf blades flat. Inflorescences paired or digitate spike-like racemes or racemes solitary; spikelets paired, one sessile, the other pedicellate; sessile spikelet with 2 florets, lower usually male, upper bisexual, dorsally compressed, glumes \pm equal and \pm as long as spikelet, or sometimes upper glume longer than lower, upper glume sometimes awned, lower floret with lemma shorter than spikelet, palea \pm as long as lemma, upper floret with lemma shorter than spikelet, usually bifid and awned from sinus, palea \pm as long as lemma; pedicellate spikelets male or sterile, similar to sessile spikelet or \pm reduced, awnless; stamens 3; stigmas distinct.

About 60 species from tropical Africa, Asia, America and Australia; *ca* 8 species Australia; 3 species south-eastern Queensland.

- | | | |
|--|------------------------|---|
| 1. Habit decumbent; inflorescences of 3 racemes | 1. <i>I. triticeum</i> | |
| Habit \pm erect; inflorescences of 1 or 2 racemes | | 2 |
| 2. Inflorescences of a single raceme; lower glume of sessile spikelet broadly winged | 2. <i>I. fragile</i> | |
| Inflorescences of 2 racemes; lower glume of sessile spikelet with narrow wings | 3. <i>I. australe</i> | |

1. *Ischaemum triticeum* R. Br.

Perennial, decumbent, trailing stems often 1–2 m long, rooting at nodes; culms branched, nodes hairy. Leaf sheaths glabrous to pubescent; ligules 3–4 mm long; leaf blades linear-elliptic or linear-ovate, narrowed at both ends, mostly 8–15 cm \times 0.6–1.2 cm, occasionally up to *ca* 30 cm long, glabrous. Inflorescences of 2 or 3 digitate stout racemes 5–10(–13) cm long; sessile spikelets 6–10 mm long, lower glume with narrow wings, upper glume winged on back, lower floret with lemma *ca* 7-nerved, upper floret with lemma bilobed, awn 0.8–1.2 cm long; pedicellate spikelets slightly smaller than sessile spikelets.

Coastal areas of the region, often on coastal sand dunes.

2. *Ischaemum fragile* R. Br.

Digastrium fragile (R. Br.) A. Camus

Perennial, tufted, erect, up to 1.1 m tall; culms unbranched, nodes glabrous to pubescent. Leaf sheaths glabrous to \pm pubescent; ligules 1–1.5 mm long; leaf blades linear or linear-elliptic, tapered at both ends, up to *ca* 20 cm \times 0.3–0.7 cm, glabrous to pubescent. Racemes solitary, 3–6.5 cm long; sessile spikelets 6–7 mm long, lower glume winged, upper glume slightly longer than lower, with awn up to *ca* 2 mm long, lower floret with lemma 1–3-nerved; upper floret with lemma 2-lobed, with awn 1–2 cm long; pedicellate spikelets 4–5 mm long. **Fig. 381.**

Coastal parts of the region, usually on damp sandy soils.

3. *Ischaemum australe* R. Br.

Perennial, tufted or shortly rhizomatous, \pm erect, up to *ca* 90 cm tall; culms sparsely branched, nodes hairy (in south-eastern Queensland) or glabrous. Leaf sheaths glabrous or hairy; ligules *ca* 2 mm long; leaf blades \pm linear or linear-elliptic, apex tapering, 4–22 cm \times 0.3–1.2 cm, glabrous or hairy. Inflorescences of 2 digitate racemes 3–10 cm long; sessile spikelets 6–7 mm long, glumes with narrow minutely ciliate wings, lower floret with lemma 3-nerved, upper floret with lemma deeply bilobed, awn 8–10 mm long; pedicellate spikelet similar, but lower glume unequally winged, awn of lemma of upper floret shorter than that of lemma of sessile spikelet.

Two varieties occur in the region:

- | | |
|---|---|
| 1. Leaves, rachis internodes and pedicels densely hairy | <i>I. australe</i> var. <i>villosum</i> |
| Leaves, rachis internodes and pedicels glabrous | <i>I. australe</i> var. <i>australe</i> |

I. australe var. *villosum* (R. Br.) Benth. (*I. villosum* R. Br.) is known from swampy areas of eastern Moreton district. *I. australe* var. *australe* is known from damp soils in the Moreton and Wide Bay districts and from the extreme south-eastern Darling Downs district.

102. *SEHIMA* Forssk.

Annuals or perennials. Ligules reduced to line of hairs or cilia; leaf blades flat. Inflorescences solitary spike-like racemes; spikelets in pairs, one sessile, one pedicellate, those of each pair usually differing in sex and often shape; sessile spikelets with 2 florets, lower male, upper bisexual, glumes equal or subequal, as long as spikelet, lower usually deeply grooved with narrow membranous wing towards apex, bidentate, upper glume laterally compressed, with an apical bristle, lower floret with hyaline lemma, palea present, upper floret with lemma bidentate with awn arising in sinus, palea present; pedicellate spikelet with 2 florets, both male or lower or both reduced and sterile, lower

glume usually strongly nerved, lemma of upper floret without awn, otherwise florets similar to lower floret of sessile spikelet.

About 5 species, tropical Africa, Asia and Australia; 1 species Australia, occurring in south-eastern Queensland.

1. *Sehima nervosum* (Rottler) Stapf

RAT'S TAIL GRASS

Andropogon nervosus Rottler; *Ischaemum nervosum* (Rottler) C. A. Gardner

Tufted perennial, erect, up to *ca* 1 m tall; culms usually unbranched, nodes glabrous or hairy. Leaf sheaths glabrous or sparsely hairy; ligules 1–2 mm long; leaf blades linear, apex long attenuate, 5–40 cm \times 0.2–0.7 cm, glabrous, scabrous. Racemes 3–12 cm long; spikelets 8–10 mm long; sessile spikelet with glumes \pm equal, upper passing into bristle 0.7–1.5 cm long, lower floret with lemma slightly shorter than spikelet, margin ciliate, palea slightly shorter than lemma, upper floret with lemma slightly shorter than spikelet, margin ciliate, awn 3.5–4.5 cm long; pedicellate spikelet with lower floret male or sterile, upper floret male.

Known from a few localities in the Moreton, Darling Downs and Burnett districts, often on poor soils. It is of little forage value.

103. EREMOCHLOA Büse

Perennials. Ligules short; leaf blades often folded. Inflorescences solitary spike-like racemes, uppermost spikelets often deformed and rudimentary; fertile spikelets sessile, each accompanied by pedicels bearing rudimentary spikelet, florets 2, lower male, upper female or bisexual; lower glume membranous, sometimes winged at tip, 7-nerved, upper glume thickly winged on keel in lower part; lower floret with hyaline lemma and palea; upper floret with hyaline lemma and palea, equal to or shorter than those of lower floret; stamens 3; styles distinct.

6 species south-eastern Asia and Australia; 3 species Australia; 1 species south-eastern Queensland.

1. *Eremochloa bimaculata* Hackel

POVERTY GRASS

Ischaemum pectinatum auct. non Trin.; *Eremochloa muricata* auct. non (Retz.) Hackel

Tufted, \pm erect, 30–60 cm tall; culms unbranched, nodes usually hairy, rarely glabrous. Leaf sheaths glabrous or lower sheaths hirsute on margin; ligules *ca* 1 mm long; leaf blades linear, folded when dry, apex narrowed to point, 5–12 cm \times 0.2–0.4 cm, glabrous. Racemes 5–10 cm long; fertile spikelets 4–5 mm long; lower glume as long as spikelet, with fringe of stiff spines *ca* 0.75 mm long on either side, upper glume slightly shorter than lemma of lower floret, 3-nerved; lemmas of both florets \pm equal, 3–4 mm long, paleas as long as lemmas. **Fig. 38K.**

Widespread in the region, often on poorer soils. It is of little forage value.

104. ELIONURUS Willd.

Annuals or perennials. Ligules membranous or a line of hairs; leaf blades flat or rolled. Inflorescences solitary spike-like racemes, sometimes gathered into spatheate false panicles (not in Australia); spikelets in pairs, differing in sex and form; sessile spikelet with lower floret reduced to hyaline lemma, upper floret bisexual, lower glume with tip usually bifid, cuspidate, 2-keeled, keels ciliate fringed, upper glume shorter than lower, lemmas of both florets shorter than glumes, palea absent or minute; pedicellate spikelet sterile; stamens 3; styles distinct.

About 14 species, tropical Africa, America and Australia; 1 species Australia, occurring in south-eastern Queensland.

1. *Elionurus citreus* (R. Br.) Monro ex Benth.

LEMON-SCENTED GRASS

Andropogon citreus R. Br.; *Elionurus papuanus* Lauterb. & Schumacher

Perennial, erect, up to *ca* 1 m tall; culms branched in upper part, nodes glabrous. Leaf sheaths glabrous; ligules a rim of short hairs; leaf blades narrowly linear, inrolled up to

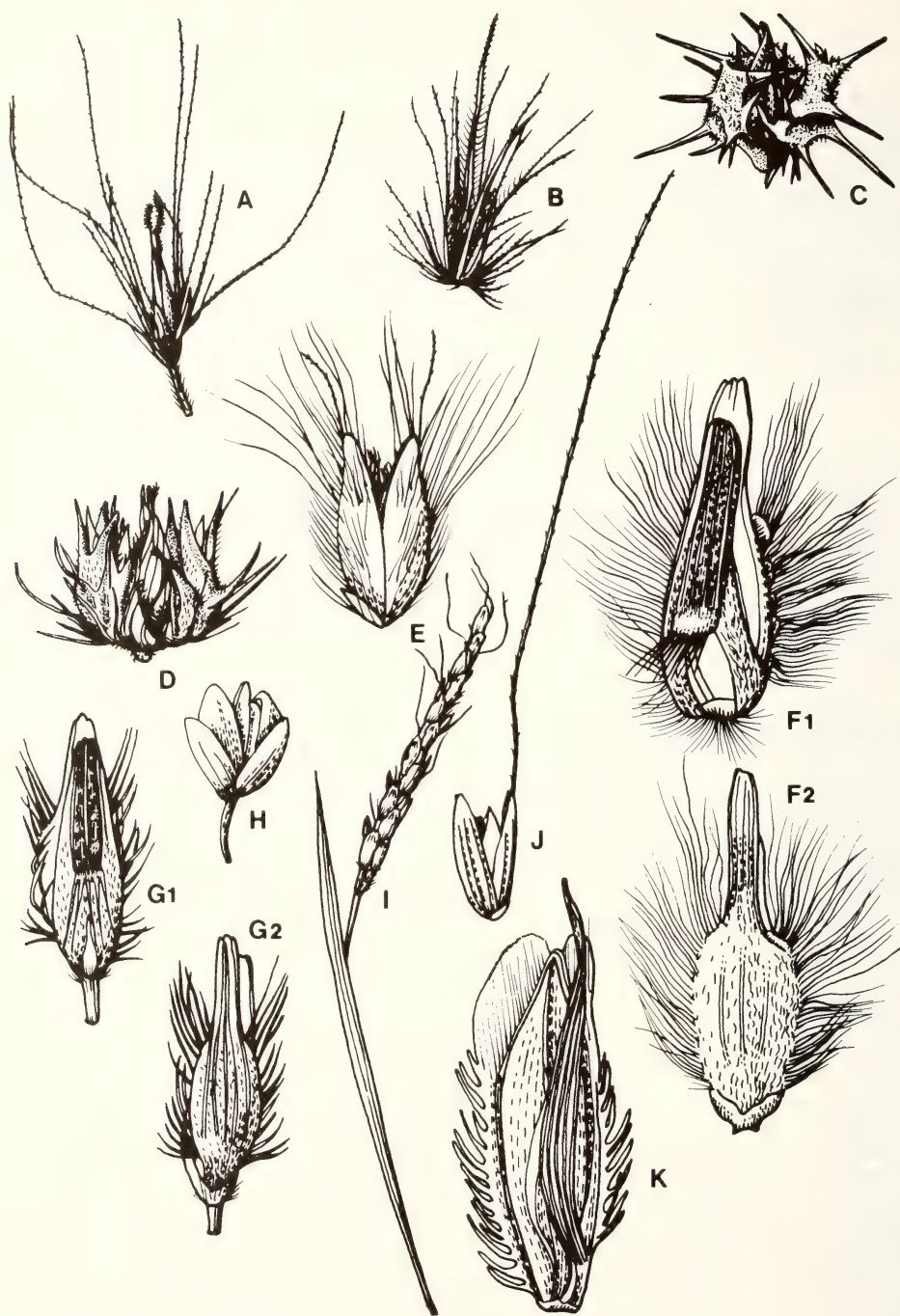


Fig. 38 POACEAE — **A** *Pennisetum alopecuroides*, spikelet x 3; **B–D** *Cenchrus* spp. — spikelets, all x 3; **B** *C. ciliaris*; **C** *C. longispinus*; **D** *C. echinatus*; **E** *Rhynchelytrum repens*, spikelet x 8; **F–G** *Thyridolepis* spp. — spikelets, all x 8; **F1–F2** *T. mitchelliana*, **F1** front view, **F2** back view; **G1–G2** *T. xerophila*, **G1** front view, **G2** back view; **H** *Isachne globosa*, spikelet x 8; **I** *Ischaemum fragile*, inflorescence x 1; **J** *Melinis minutiflora*, spikelet x 8; **K** *Eremochloa bimaculata*, spikelet x 8.

40 cm \times ca 0.1 cm, rarely wider, glabrous. Inflorescences racemes 3–12 cm long, arising singly or several together in spathe-like leaf sheaths from upper nodes of culms; sessile spikelets 1–1.2 cm long, lower glume 9-nerved, with dense fringe of stiff white hairs, upper glume $\frac{1}{2}$ – $\frac{2}{3}$ length of spikelet, 3-nerved, minutely hairy, lower floret with lemma ca $\frac{3}{4}$ length of spikelet, with few hairs near apex, palea absent, upper floret with lemma slightly shorter than lemma of lower floret, palea absent; pedicellate spikelet 8–10 mm long, reduced to 2 dissimilar glumes, lower asymmetrical, upper symmetrical. **Fig. 39A.**

Known from eastern parts of the Moreton and Wide Bay districts, usually on sandy soils, often in coastal wallum areas or on coastal sand dunes. When crushed it emits a lemon odour.

105. HEMARTHRIA R. Br.

Perennials. Ligules membranous, short; leaf blades flat. Inflorescences solitary spike-like racemes, embraced below by subtending spathe-like sheath; spikelets appearing opposite due to fusion of joints and pedicels, each pair consisting of sessile spikelet and pedicellate spikelet which is companion to sessile spikelet of next lower node; spikelets with 2 florets, lower reduced to lemma, upper bisexual; glumes of each spikelet equal or subequal, sometimes glumes of pedicellate spikelet longer than glumes of sessile spikelet, upper glumes of pedicellate spikelet mucronate or aristate; lower floret with hyaline lemma, 2-nerved; upper floret with nerveless lemma, palea small, nerveless; stamens 3; styles distinct.

About 12 species, tropical and subtropical regions of the world; 1 species Australia, occurring in south-eastern Queensland.

1. *Hemarthria uncinata* R. Br.

MATGRASS

Hemarthria compressa auct. non (L. f.) R. Br.

Ascending from decumbent and creeping stems rooting at nodes, up to 80 cm tall; culms branched or unbranched, nodes glabrous. Leaf sheaths glabrous or with few hairs; ligules a very short ciliate rim; leaf blades linear, apex attenuate, 5–15 cm \times 0.15–0.5 cm, glabrous except for few hairs near base. Racemes 6–15 cm long, glabrous throughout; sessile spikelets 6–10 mm long, pedicellate spikelets slightly longer and more acuminate; lower glume asymmetrical, as long as spikelet, apex with straight or hooked point, upper glume of pedicellate spikelet asymmetrical, winged on one keel, upper glume of sessile spikelet \pm adnate to rachis of raceme, free apex straight or hooked; lemmas of lower florets of both spikelets as long as spikelet, 2-nerved, lemmas of upper floret of both spikelets slightly shorter than lemmas of lower floret, palea of upper florets of both spikelets as long as lemma.

Two varieties occur in the region:

- | | | | | | | |
|--|---|---|---|---|---|--|
| 1. Leaf sheaths loose, expanded, flattened | . | . | . | . | . | <i>H. uncinata</i> var. <i>spathacea</i> |
| Leaf sheaths not as above | . | . | . | . | . | <i>H. uncinata</i> var. <i>uncinata</i> |

H. uncinata* var. *spathacea (Domin) Vickery (*Rottboellia compressa* L. f. var. *spathacea* Domin) occurs in Burnett, Wide Bay and Moreton districts, often on damp sandy soils. ***H. uncinata* var. *uncinata*** is known from the Moreton, Wide Bay and Darling Downs districts, on coastal sandy soils.

106. ROTTBOELLIA L.

Annuals. Ligules short, membranous; leaf blades flat. Inflorescences solitary spike-like racemes, sometimes gathered into spatheate false panicle; spikelets in pairs, differing in sex and sometimes form, upper spikelets of raceme often reduced; sessile spikelet with 2 florets, lower male or sterile, upper bisexual, lower glume as long as spikelet, 2-keeled, narrowly winged at apex, 11–13-nerved, upper glume \pm as long as spikelet, dissimilar to lower glume, boat-shaped, winged, lower floret with lemma as long as or shorter than spikelet, 3-nerved, palea $\frac{3}{4}$ or more length of lemma; pedicellate spikelet with florets male or sterile, slightly smaller than sessile spikelet; stamens 3; styles distinct.

4 species, tropical and subtropical Africa, Asia and Australia; 1 species Australia, occurring in south-eastern Queensland.

1. *Rottboellia cochinchinensis* (Lour.) W. D. Clayton

Stegosia cochinchinensis Lour.; *Rottboellia exaltata* auct. non (L.) L. f., L. f.

Annual, erect, up to *ca* 3 m tall; culms supported by prop roots, nodes glabrous. Leaf sheaths glabrous or with sparse tubercular-based hairs; ligules *ca* 2 mm long; leaf blades linear to broadly linear, apex attenuate, up to 45 cm × 0.5–5 cm, glabrous or with sparse tubercular-based hairs. Racemes 3–15 cm long, terminating with several reduced spikelets; sessile spikelets 3.5–5.5 mm long; pedicellate spikelets herbaceous, green, 3–5 mm long. **Fig. 39B.**

Recorded once from the region, growing in a sugar cane crop near Nambour in the Moreton district.

107. SORGHUM Moench

Annuals or perennials, sometimes rhizomatous. Ligules membranous or scarious, rarely a line of hairs. Inflorescences large terminal panicles; spikelets in pairs, those of each pair dissimilar, one sessile and one pedicellate, florets 2, lower reduced to lemma, upper bisexual in sessile spikelets, male or sterile or absent in pedicellate spikelets; sessile spikelets with glumes equal, as long as spikelet, upper glume boat-shaped, lower floret with lemma 2-nerved or nerveless, palea often minute or absent, upper floret with lemma 1-or 3-nerved, apex 2-lobed with awn or mucro in sinus, palea minute or absent; pedicellate spikelets narrower than sessile spikelets, awnless, sometimes reduced to 1 or 2 glumes or rarely absent.

About 50 species, tropical and subtropical areas; *ca* 21 species Australia; 8 species south-eastern Queensland.

- | | | |
|--|--|---|
| 1. Pedicellate spikelets reduced to lower glume | 1. <i>S. laxiflorum</i> | 2 |
| Pedicellate spikelets fully developed | | |
| 2. Nodes conspicuously bearded | | 3 |
| Nodes glabrous or finely pubescent | | 4 |
| 3. Sessile spikelets less than 6 mm long | 2. <i>S. nitidum</i> forma
<i>aristatum</i> | |
| Sessile spikelets 6–8 mm long | 3. <i>S. leiocladum</i> | |
| 4. Panicle axis tough, much thicker than branches; caryopses usually
exposed at maturity; lemma of upper floret not awned | 4. <i>S. bicolor</i> | |
| Panicle axis fragile, slightly thicker than branches; caryopses usually
enclosed by glumes at maturity; lemma of upper floret usually awned | | 5 |
| 5. Plants with rhizomes | | 6 |
| Plants tufted, without rhizomes | | 7 |
| 6. Sessile spikelet 5–6.5 mm long; lowermost panicle branches mostly 4–9
together; rhizome internodes short and thick | 5. <i>S. × alnum</i> | |
| Sessile spikelet 4.5–5 mm long; lowermost panicle branches mostly 2–4
together; rhizome internodes mostly long and thin | 6. <i>S. halepense</i> | |
| 7. Spikelets disarticulating readily at maturity, sessile spikelets breaking
clean from rachis, pedicellate spikelets falling free from pedicel;
plants mostly perennial, occasionally annual | 7. <i>S. verticilliflorum</i> | |
| Spikelets not disarticulating readily at maturity, sessile spikelets
breaking away attached to upper portion of rachis internode,
pedicellate spikelets persisting on pedicels; plants annuals | 8. <i>S. sudanense</i> | |

1. *Sorghum laxiflorum* F. M. Bailey

Perennials, decumbent or ascending, up to 1 m tall, rooting at lower nodes; culms mostly unbranched, nodes pubescent. Leaf sheaths glabrous; leaf blades linear, apex tapering, up to *ca* 45 cm × 0.3–1.5 cm, glabrous. Inflorescences nodding, up to *ca* 12 cm long; sessile spikelets sometimes solitary on short filiform branches and appearing pedicellate, 4–5 mm long, lower glume with long dense silky hairs, upper glume almost glabrous, lemma of

upper floret with awn *ca* 3.5 cm long, twisted at base; pedicellate spikelets reduced to narrow sparsely hairy glume *ca* 4 mm long on densely hairy pedicel.

Recorded once from the region, from near Gympie in the Wide Bay district.

2. *Sorghum nitidum* (Vahl) Pers. forma *aristatum* C. E. Hubbard

BROWN SORGHUM

Sorghum serratum (Thunb.) Kuntze

Perennial, erect, up to 2 m tall; culms unbranched or with few branches, nodes bearded. Leaf sheaths glabrous or with spreading tubercular-based hairs; leaf blades linear, apex attenuate, up to *ca* 45 cm \times 0.3–1.2 cm, \pm glabrous. Inflorescences up to *ca* 40 cm long; sessile spikelets 3.5–5.5 mm long, glumes with \pm dense long brown hairs, lemma of upper floret with awn up to *ca* 2 cm long, twisted at base; pedicellate spikelets 2.5–5.5 mm long, glumes with \pm dense long brown hairs.

Known from the Burnett and Wide Bay districts; not common.

3. *Sorghum leiocladum* (Hackel) C. E. Hubbard

WILD SORGHUM

Andropogon australis Sprengel subsp. *leiocladus* Hackel

Perennial, erect, up to *ca* 1.5 m tall; culms unbranched, nodes densely bearded. Leaf sheaths glabrous to pilose; leaf blades narrowly linear, apex tapered, up to *ca* 70 cm \times 0.15–0.35 cm, rarely wider. Inflorescences 5–35 cm long; sessile spikelets 6–8 mm long, glumes with \pm dense long reddish or brownish hairs, lemma of upper floret with awn 1–2.5 cm long, twisted at base; pedicellate spikelets 5–8 mm long, glumes with sparse to dense long hairs. **Fig. 39C.**

Widespread in the region, often in open eucalypt communities.

4. **Sorghum bicolor* (L.) Moench

**FORAGE SORGHUM; GRAIN SORGHUM;
SWEET SORGHUM; BROOM MILLET**

Holcus bicolor L.; *Sorghum dochna* (Forssk.) Snowden; *S. cernuum* (Ard.) Host; *S. roxburghii* Stapf; *S. drummondii* Steudel

Annual, very variable, erect, 0.5–3 m tall; culms unbranched, usually with well developed prop roots, nodes usually pubescent. Leaf sheaths usually glabrous; leaf blades linear, apex tapering, mostly up to 75 cm \times 1–5 cm, usually glabrous. Inflorescences very variable, open or dense, up to *ca* 25 cm long; sessile spikelets 4–6 mm long, glumes pubescent, lemma of upper floret without awn; pedicellate spikelets usually slightly longer than sessile spikelets. Caryopses usually exposed at maturity by gaping glumes.

Probably of African origin, many forms of the species widely cultivated throughout the warmer parts of the world; naturalized in many places in the region. Fresh growth may be poisonous to stock.

5. **Sorghum* \times *alimum* L. R. Parodi

COLUMBUS GRASS

Perennial, shortly rhizomatous, erect, up to 2.5 m tall; culms mostly unbranched; nodes glabrous or finely pubescent. Leaf sheaths usually glabrous; leaf blades linear, apex tapering, mostly up to 45 cm \times 0.5–2 cm, usually glabrous. Panicles large, freely branched, up to *ca* 35 cm long; sessile spikelets 5–6.5 mm long, glumes pubescent at least on margin, lemma of upper floret often with awn 1–2 cm long, twisted at base; pedicellate spikelets 5–7 mm long.

First described from Argentina; widely grown for fodder in Queensland in areas of 500–900 mm rainfall, naturalized in drier parts of the region. It is believed to be a natural hybrid with *Sorghum halepense* as one of the parents. Potentially toxic amounts of nitrate have been reported in this species but no cases of nitrate poisoning have been noted.

6. **Sorghum halepense* (L.) Pers.

JOHNSON GRASS

Holcus halepensis L.; *Sorghum halepense* forma *muticum* (Hackel) C. E. Hubbard

Perennial with extensive rhizomes, erect, up to *ca* 1.8 m tall; culms mostly unbranched, nodes glabrous or pubescent. Leaf sheaths usually glabrous; leaf blades linear, apex tapered, up to 60 cm \times 0.5–2 cm, mostly glabrous. Inflorescences variable, up to *ca* 35 cm long; sessile spikelets 4.5–5 mm long, glumes pubescent, lemma of upper floret often with awn 1–2 cm long, twisted at base; pedicellate spikelets 5–6 mm long.

Native of the Mediterranean region; introduced to Australia as a fodder grass, naturalized and widespread in south-eastern Queensland. It is a troublesome weed in cultivation because of its widely spreading rhizomes. It contains HCN and is potentially toxic to stock.

7. **Sorghum verticilliflorum* (Steudel) Stapf**WILD SORGHUM**

Andropogon verticilliflorus Steudel; *A. sorghum* (L.) Brot. subsp. *verticilliflorus* (Steudel) Piper

Perennial, loosely tufted, sometimes annual, erect, up to 3.5 m tall, with distinct prop roots; culms mostly unbranched, nodes pubescent. Leaf sheaths glabrous; leaf blades linear, apex attenuate, up to *ca* 60 cm \times 0.8–3 cm, glabrous. Inflorescences up to 50 cm long; sessile spikelets 5.5–7.5 mm long, glumes hairy at least when young, often becoming less hairy with age, lemmas of both florets ciliate, lemma of upper floret with awn up to *ca* 1.6 cm long, twisted at base; pedicellate spikelet *ca* 4.5–7 mm long.

Native of tropical Africa; naturalized and widespread in the region. It contains HCN and is potentially toxic to stock.

8. **Sorghum sudanense* (Piper) Stapf**SUDAN GRASS**

Andropogon sorghum (L.) Brot. subsp. *sudanensis* Piper

Annual, erect, up to 3 m tall, loosely tufted, often with prop roots; culms sparsely branched, nodes pubescent. Leaf sheaths glabrous; leaf blades linear, apex attenuate, up to 50 cm \times 0.8–2.5 cm, glabrous. Inflorescences up to *ca* 35 cm long; sessile spikelets 5.5–7.5 mm long, glumes sparsely hairy, lemma of upper floret with awn up to 1.5 cm long and twisted at base; pedicellate spikelets 5.5–8 mm long, with few hairs.

Native of north-eastern Africa; cultivated as a fodder grass, naturalized and widespread in the region. Under certain conditions it can be poisonous to stock.

108. CAPILLIPEDIUM Stapf

Perennials (in Australia) or annuals. Ligules membranous; leaf blades flat. Inflorescences panicles with capillary branches, branches bearing short racemes with 1–8 pairs of spikelets, each pair with one sessile and one pedicellate spikelet, uppermost pair forming triad with terminal spikelet; sessile spikelets with 2 florets, lower floret reduced to lemma, upper bisexual, glumes equal, lower glume 2-keeled, upper glume boat-shaped, 3-nerved, lemma of lower floret hyaline, lemma of upper floret linear, passing into awn, palea absent; pedicellate spikelets with 1 floret, male or sterile, lemma sometimes absent; stamens 3; styles distinct.

About 14 species, Africa through Asia to Australia; 2 species Australia, both occurring in south-eastern Queensland.

1. Racemes 1-jointed with 1 sessile and 2 pedicellate spikelets or occasionally 2-jointed and then with 2 sessile and 3 pedicellate spikelets

1. *C. parviflorum*

- Racemes 3–8-jointed, with upper joint with 1 sessile and 2 pedicellate spikelets, lower joints with 1 sessile and 1 pedicellate spikelet

2. *C. spicigerum*

1. *Capillipedium parviflorum* (R. Br.) Stapf**SCENTED TOP**

Holcus parviflorus R. Br.; *Chrysopogon parviflorus* (R. Br.) Benth.; *C. parviflorus* var. *flavescens* F. M. Bailey; *Andropogon parviflorus* (R. Br.) Domin; *Raphis parviflora* (R. Br.) Chase; *Dichanthium parviflorum* (R. Br.) de Wet

Perennial, tufted, erect, up to *ca* 1.5 m tall; culms unbranched or sparingly branched, nodes bearded. Leaf sheaths glabrous or pubescent, ciliate on margin; ligules short, truncate; leaf blades linear, apex attenuate, up to *ca* 30 cm \times 0.2–0.7 cm, glabrous or pubescent. Inflorescences up to *ca* 25 cm long, racemes reduced to 1 sessile and 2 pedicellate spikelets or occasionally 2-jointed and then with 2 sessile and 3 pedicellate spikelets; sessile spikelet 2.8–4 mm long, lower glume sometimes pubescent, lower floret with lemma $\frac{1}{2}$ – $\frac{4}{5}$ length of spikelet, upper floret with linear stipe-like lemma with awn 1–1.5 cm long; pedicellate spikelet usually male, 2.5–3.5 mm long, lemma as long as glumes.

Widespread in eastern Moreton district, often in eucalypt open forest, also known from south-eastern Darling Downs district and south-eastern Wide Bay district. Of little fodder value.

2. *Capillipedium spicigerum* S. T. Blake

SCENTED TOP

Chrysopogon parviflorus (R. Br.) Benth. var. *spicigera* Benth.; *Andropogon parviflorus* (R. Br.) Domin var. *spicigerus* (Benth.) Domin; *A. parviflorus* var. *muelleri* (Hackel) Domin; *Dichanthium parviflorum* (R. Br.) de Wet var. *spicigerum* (S. T. Blake) de Wet. Perennial, tufted, erect, up to 1.5 m tall; culms unbranched or sparsely branched, nodes bearded. Leaf sheaths glabrous or pubescent; ligules short, truncate; leaf blades linear, apex attenuate, up to ca 40 cm × 0.5–0.8 cm, glabrous or pubescent. Inflorescences up to ca 25 cm long, racemes with spikelets arising at 3–8 joints, each joint of with 1 sessile and 1 pedicellate spikelet at each joint except terminal joint which has 1 sessile and 2 pedicellate spikelets; sessile spikelet 3–4 mm long, lower glume ± pubescent, lower floret with lemma $\frac{1}{2}$ – $\frac{2}{3}$ length of spikelet, upper floret with linear stipe-like lemma with awn 1–1.6 cm long; pedicellate spikelet ca 3–3.5 mm long, lemma as long as glumes or very short or absent.

Widespread in the region in a variety of habitats. Of little fodder value.

109. CHRYSOPOGON Trin.

Perennials or annuals. Ligules membranous or a line of hairs; leaf blades flat to convolute. Inflorescences terminal panicles with whorls of slender branches each bearing terminal racemes, each raceme consisting of solitary triad of spikelets, bearded callus present at base of triad, each triad consisting of 1 sessile and 2 pedicellate spikelets, occasionally racemes consisting of 2 or 3 groups of spikelets, upper group consisting of a triad of 1 sessile and 2 pedicellate spikelets, other group(s) consisting of 1 sessile and 1 pedicellate spikelet; spikelets with 2 florets, lower floret reduced to lemma, upper bisexual in sessile spikelets and male or sterile in pedicellate spikelets; sessile spikelets with glumes subequal, upper glume boat-shaped, often awned, lower floret with lemma hyaline, upper floret with lemma usually with an awn, palea small and hyaline or absent; pedicellate spikelets with or without awn.

About 24 species, tropical and warm temperate areas of Europe, Africa, Asia, Australia and tropical America; 6 species Australia; 3 species south-eastern Queensland.

- | | |
|---|-------------------------|
| 1. Plants creeping; callus at base of sessile spikelet 3–6 mm long; upper glumes of sessile spikelets each with awn 1.5–2 mm long | 1. <i>C. acicularis</i> |
| Plants tufted, not creeping; callus at base of sessile spikelet 1.5–3 mm long; upper glumes of sessile spikelets each with awn 3–10 mm long | 2 |
| 2. Racemes 1- or rarely 2-jointed; pedicellate spikelets mostly awned; upper glumes of sessile spikelets each with awn 5–10 mm long | 2. <i>C. fallax</i> |
| Racemes mostly 2-jointed; pedicellate spikelets without awns; upper glumes of sessile spikelets each with awn 3–5 mm long | 3. <i>C. sylvaticus</i> |

1. *Chrysopogon aciculatus* (Retz.) Trin.

MACKIE'S PEST

Andropogon aciculatus Retz.

Perennial, creeping; flowering culms up to ca 40 cm tall, unbranched, nodes glabrous. Leaf sheaths glabrous or with long hairs on margin; ligules truncate; leaf blades linear to narrowly ovate, 2–20 cm × 0.4–0.8 cm, those of creeping stems broader than those of flowering culms, glabrous, margins spinulose. Inflorescences up to ca 12 cm long; racemes mostly of a single triad; sessile spikelet 4–4.5 mm long, callus 3–6 mm long, shortly bearded, glumes as long as spikelets, upper glume with awn 1.5–2 mm long, lower floret with lemma 2–3 mm long, upper floret with lemma ca 3 mm long, with awn 2.5–8 mm long; pedicellate spikelet 4.5–6.5 mm long, without awns.

Collected in the Moreton district in 1917 but not collected in the region since then.

2. *Chrysopogon fallax* S. T. Blake

GOLDEN BEARDGRASS

Perennial, tufted, erect, up to 1.2 m tall; culms unbranched or with few branches, nodes glabrous. Leaf sheaths with tubercular-based hairs or ± glabrous; ligules ciliolate; leaf blades narrowly linear, apex attenuate, up to 45 cm × 0.1–0.2 cm, glabrous or with tubercular-based hairs, margin spinulose towards base. Inflorescences up to 21 cm long;

racemes mostly of a single triad, rarely of 2 groups of spikelets; sessile spikelet 7–9 mm long, callus 2–3 mm long, bearded, glumes as long as spikelet, upper glume with awn 5–10 mm long, lower floret with lemma 5–7.5 mm long, upper floret with lemma 5.5–7 mm long, with awn 2–4 cm long; pedicellate spikelet *ca* as long as sessile one, mostly awned.

Widespread in the region, mostly on sandy soils. It is considered to be a good fodder grass.

3. *Chrysopogon sylvaticus* C. E. Hubbard

Perennial, tufted, erect, up to 1.2 m tall; culms usually branched, nodes glabrous. Leaf sheaths glabrous; ligules ciliate; leaf blades narrowly linear, up to 50 cm \times 0.2–0.6 cm, glabrous or sparsely hairy, margin spinulose towards base. Inflorescences up to *ca* 18 cm long; racemes of 1–3 groups of spikelets but mostly 2 groups; sessile spikelets 5.5–7.5 mm long, callus 1.5–2 mm long, bearded with hairs up to 3.5 mm long, glumes as long as spikelet, upper glume with awn 3–5 mm long, lower floret with lemma *ca* 5 mm long, upper floret with lemma *ca* 5 mm long, with awn 1.7–2.5 cm long; pedicellate spikelets 3–7 mm long, without awns.

Common in the Moreton district, also known from the Wide Bay and Burnett districts, usually in open eucalypt communities.

110. VETIVERIA Bory

Perennials, with stout rhizomes. Ligules a short membrane or line of hairs; leaf blades flattening upwards. Inflorescences panicles with whorls of slender racemes; spikelets in pairs, 1 sessile and 1 pedicellate; spikelets with 2 florets, lower floret reduced to lemma, upper bisexual in sessile spikelet, male or sterile in pedicellate spikelet; sessile spikelet with glumes equal, upper boat-shaped, 3-nerved, with or without awn, lemma of upper floret with or without awn; pedicellate spikelets similar to sessile ones but smaller, not awned.

About 10 species, warmer parts of Asia, Africa and Australia; 4 species Australia; 1 species south-eastern Queensland.

1. *Vetiveria filipes* (Benth.) C. E. Hubbard

AUSTRALIAN VETIVERIA

Chrysopogon elongatus (R. Br.) Benth. var. *filipes* Benth.; *C. gryllus* (L.) Trin. var. *spicigera* Maiden & Betche

Densely tufted, erect, up to *ca* 1 m tall; culms unbranched or sparsely branched, nodes glabrous. Leaf sheaths compressed, glabrous; ligules a ciliate rim; leaf blades linear, apex attenuate, up to 45 cm \times 0.3–0.6 cm, scabrous above. Panicles up to *ca* 30 cm long, racemes 3.5–9 cm long, with up to 7 pairs of spikelets; sessile spikelet 8–10 mm long with basal callus 2.5–3.5 mm long bearded with brownish hairs up to 1.5 mm long, glumes as long as spikelet, upper glume with awn up to *ca* 3.5 mm long, lower floret with lemma *ca* as long as spikelet, margin ciliate, upper floret with lemma *ca* as long as spikelet with awn 1.3–2.6 cm long, palea *ca* 3 mm long; pedicellate spikelet 3–8.5 mm long.

Widespread in the region, usually on river or creek banks. Apparently freely eaten by cattle.

111. BOTHRIOCHLOA C. E. Hubbard

Perennials. Ligules membranous; leaf blades flat or revolute. Inflorescences of racemes, digitate, subdigitate or paniculate, with more than 8 pairs of spikelets, rachis internodes and pedicels with translucent midline, spikelet pairs consisting of 1 sessile and 1 pedicellate spikelet; sessile spikelet with glumes unequal, florets 2, lower floret reduced to nerveless lemma, upper floret bisexual, upper lemma reduced, stipe-like, passing into slender awn, palea small or absent; pedicellate spikelet sterile, often smaller than sessile spikelet.

About 35 species, tropical and subtropical parts of the world; 10 species Australia; 7 species south-eastern Queensland.

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|--|---|---|---|---|---|---|---|---|---|---------------------------|---|---|
| 1. Awned lemmas with linear lobes | . | . | . | . | . | . | . | . | . | . | . | 2 |
| Awned lemmas without lobes | . | . | . | . | . | . | . | . | . | . | . | 4 |
| 2. Hairs of raceme rachis, pedicels and callus up to 1.5 mm long; plants rhizomatous | | | | | | | | | | 1. <i>B. bunyensis</i> | | |
| Hairs of raceme rachis, pedicels and callus 2.5 mm or more long; plants tufted, non-rhizomatous | . | . | . | . | . | . | . | . | . | . | . | 3 |
| 3. Racemes with dense silky hairs up to 8 mm long, concealing spikelets | . | . | . | . | . | . | . | . | . | 2. <i>B. erianthoides</i> | | |
| Racemes with hairs up to 5 mm long, not concealing spikelets | . | . | . | . | . | . | . | . | . | 3. <i>B. biloba</i> | | |
| 4. Pedicellate spikelets similar in appearance to sessile spikelets; sessile spikelets up to 4.5 mm long | . | . | . | . | . | . | . | . | . | . | . | 5 |
| Pedicellate spikelets dissimilar in appearance to sessile spikelets; sessile spikelets 5–7 mm long | . | . | . | . | . | . | . | . | . | . | . | 6 |
| 5. Racemes subdigitate, arranged on axis less than 4 cm long | . | . | . | . | . | . | . | . | . | 4. <i>B. ewartiana</i> | | |
| Racemes arranged in panicles, axis of each panicle 4 cm or more long | . | . | . | . | . | . | . | . | . | 5. <i>B. bladhii</i> | | |
| 6. Pedicellate spikelets reduced to 2 glumes; sessile spikelets 5–7 mm long; stamens 3 | . | . | . | . | . | . | . | . | . | 6. <i>B. macra</i> | | |
| Pedicellate spikelets reduced to 1 glume; sessile spikelets ca 5 mm long; stamens 1 | . | . | . | . | . | . | . | . | . | 7. <i>B. decipiens</i> | | |

1. *Bothriochloa bunyensis* B. Simon

Rhizomatous, erect or ascending, up to ca 60 cm tall; culms with few branches, nodes glabrous. Leaf sheaths with few often tubercular-based hairs, usually on margin; ligules up to ca 1 mm long; leaf blades linear, apex attenuate, up to 14 cm × 0.15–0.35 cm, glabrous. Racemes 2–4, digitate or subdigitate, 5–10 cm long, rachis and pedicels with long ± spreading whitish hairs; sessile spikelet 8–9 mm long, with densely bearded callus at base, lower glume as long as spikelet, with row of bristles on keels, upper glume slightly smaller than lower, lower floret with lemma ca ½ as long as spikelet, upper floret with lemma ca 4 mm long, with geniculate awn ca 2 cm long, palea ca 1 mm long; pedicellate spikelet reduced to lower glume with inrolled scabrous margin, 1–1.3 cm long. **Fig. 39D.**

Restricted to the eastern Darling Downs district; rare.

2. *Bothriochloa erianthoides* (F. Muell.) C. E. Hubbard

SATINTOP GRASS

Andropogon erianthoides F. Muell.

Densely tufted, erect, up to ca 1.2 m tall; culms unbranched or with few branches, nodes glabrous. Leaf sheaths glabrous; ligules 1.5–4 mm long; leaf blades linear, apex attenuate, up to ca 30 cm × 0.5–0.8 cm, glabrous. Racemes 3–5, subdigitate, rachis and pedicels with long silky hairs; sessile spikelet 7–8 mm long with densely bearded callus at base, lower glume as long as spikelet, densely long silky hairy on back, upper glume ca as long as spikelet, silky hairy at least on margin, lower floret with lemma slightly shorter than spikelet, upper floret with lemma ca 5 mm long, very narrow, with awn ca 1–1.5 cm long, not geniculate nor twisted, palea ca 2 mm long; pedicellate spikelet reduced to hairy lower glume and rudiment of upper glume, 3–4 mm long.

Known from the Darling Downs district, usually on heavy soils, also recorded from the Wide Bay district. It is regarded as a good fodder grass.

3. *Bothriochloa biloba* S. T. Blake

Tufted, erect or ascending, up to ca 1 m tall; culms often branched, nodes glabrous. Leaf sheaths glabrous; ligules 1–2 mm long; leaf blades linear, apex attenuate, up to 20 cm × 0.3–0.5 cm, glabrous or with scattered tubercular-based hairs. Racemes 3–8, subdigitate, rachis and pedicels with long ± spreading white hairs 4.5–6 mm long; sessile spikelet 6.5–8 mm long, with densely bearded callus at base, lower glume as long as spikelet, pilose on lower part, scabrid on upper part, not pitted but slightly depressed in middle, upper glume ± as long as spikelet, mucronulate, scabrid, lower floret with lemma ⅔–¾ length of spikelet, upper floret with lemma 3–4.5 mm long, with awn up to ca 2 cm long,

geniculate, palea 1–2 mm long; pedicellate spikelet reduced to glumes, linear-ovate, 4–6 mm long.

Known in the region from a few places in the Darling Downs district.

4. *Bothriochloa ewartiana* (Domin) C. E. Hubbard DESERT BLUEGRASS

Andropogon ewartiana Domin; *Dichanthium ewartianum* (Domin) C. A. Gardner

Tufted, \pm erect, up to ca 60 cm tall; culms simple or branched, nodes bearded. Leaf sheaths mostly glabrous; ligules ca 1–2 mm long; leaf blades linear, apex attenuate, up to 15 cm \times 0.3–0.6 cm, glabrous or with sparse tubercular-based hairs. Racemes 4–11, subdigitate, 3.5–7 cm long, rachis and pedicels with long whitish hairs; sessile spikelet 3.5–4.5 mm long, with densely bearded callus at base, lower glume as long as spikelet, hairy on back in lower part, scabrid on keels, usually pitted above middle, upper glume ca as long as spikelet, ciliate on margin, lower floret with lemma ca $\frac{2}{3}$ length of spikelet, upper floret with lemma passing into awn and scarcely discernable from awn, lemma and awn 1.5–2.5 cm long, palea absent; pedicellate spikelet ca 5 mm long.

Known from a few places in the Darling Downs district, also recorded from the Wide Bay district. It is considered palatable to stock.

5. *Bothriochloa bladhii* (Retz.) S. T. Blake FOREST BLUEGRASS

Andropogon bladhii Retz.; *Bothriochloa intermedia* (R. Br.) A. Camus

Tufted, erect or ascending, up to 1.5 m tall; culms unbranched or sparsely branched, nodes bearded or glabrous. Leaf sheaths glabrous or pubescent at base; ligules short, often with few long hairs; leaf blades linear, apex attenuate, up to 30 cm \times 0.3–0.8 cm, \pm glabrous. Inflorescences panicles, racemes numerous, borne loosely or densely, 2–5 cm long, joints and pedicels with long \pm spreading hairs; sessile spikelet 3–4 mm long with densely bearded callus at base, lower glume as long as spikelet, hairy in lower part, with or without pit, upper glume as long as spikelet, acute or \pm obtuse, lower floret with lemma \pm as long as spikelet, upper floret with lemma shorter than spikelet, awn 1–1.8 cm long, palea absent; pedicellate spikelet reduced to glumes, linear-ovate, 4–6 mm long.

Widespread in the region in a variety of habitats. Regarded as a good fodder grass.

Another similar species, *Bothriochloa glabra* (Roxb.) A. Camus, has been reported from the Moreton district, apparently as an escape from pasture trials. It is apparently not truly naturalized. The lower glume of the sessile spikelet of *Bothriochloa glabra* is always pitted whereas the lower glume of the sessile spikelet of *B. bladhii* is unpitted or rarely pitted.

6. *Bothriochloa macra* (Steudel) S. T. Blake REDLEG GRASS

Andropogon macra Steudel; *Bothriochloa ambigua* S. T. Blake

Tufted, ascending, up to ca 1 m tall; culms branched, nodes glabrous or pubescent. Leaf sheaths glabrous or pubescent at base; ligules 1.5–2.5 mm long; leaf blades linear, apex attenuate, up to 30 cm \times 0.25–0.55 cm, with sparse tubercular-based hairs. Racemes 3–6, subdigitate, 5–10 cm long, rachis and pedicels with long whitish hairs; sessile spikelet 5–7 mm long, with densely bearded callus at base, lower glume as long as spikelet, hairy in lower part or rarely glabrous, spinulose-scabrid on keels above, pitted or unpitted, upper glume slightly smaller than lower one, spinulose-scabrid on keel, lower floret with lemma ca $\frac{3}{4}$ length of spikelet, upper floret with lemma ca 3 mm long, with awn ca 1.7–2 cm long; pedicellate spikelet reduced to glumes, 4.5–6 mm long.

Known from a few widespread localities in the region but seldom collected.

7. *Bothriochloa decipiens* (Hackel) C. E. Hubbard PITTED BLUEGRASS

Andropogon pertusus (L.) Willd. var. *decipiens* Hackel; *A. decipiens* (Hackel) Domin

Tufted, erect, up to 2 m tall; culms unbranched or branched, nodes glabrous. Leaf sheaths glabrous or with few tubercular-based hairs; ligules ca 0.75–1.5 mm long; leaf blades linear, apex attenuate, up to ca 35 cm \times 0.2–0.6 cm, glabrous or with sparse tubercular-based hairs. Racemes 3–5, subdigitate, 2–7 cm long, joints and pedicels with long brownish white hairs; sessile spikelet ca 5 mm long with densely bearded callus at

base, lower glume as long as spikelet, pilose on back in lower part, scabrid on nerves, usually pitted above middle, upper glume *ca* as long as spikelet, lower floret with lemma *ca* $\frac{3}{5}$ as long as spikelet, upper floret with lemma *ca* 2 mm long, with geniculate awn *ca* 1.5–2.2 cm long, palea absent; pedicellate spikelet reduced to lower glume, 2.5–4 mm long.

Two varieties occur in the region:

1. Slender plants up to 1 m tall; leaves less than 25 cm × 0.2–0.4 cm
wide
- Robust plants 1–2 m tall; leaves up to 35 cm × up to 0.6 cm
- B. decipiens* var. *decipiens*
- B. decipiens* var. *cloncurrrens*

B. decipiens var. **decipiens** is widespread and moderately common in the region. **B. decipiens** var. **cloncurrrens** (Domin) C. E. Hubbard (*Andropogon decipiens* var. *cloncurrrens* Domin) has been collected from the Burnett district. Neither variety is considered palatable to stock.

112. DICHANTHIUM Willemet

Annuals or perennials. Ligules membranous; leaf blades flat to revolute. Inflorescences of subdigitate racemes; spikelets in pairs, 1 sessile and 1 pedicellate; sessile spikelet with 2 florets, lower floret reduced to lemma, upper bisexual, lowest 1 or 2 sessile spikelets with 1 male or sterile floret, glumes equal, lower glume 2-keeled, upper boat-shaped, keeled, lower floret with lemma hyaline and nerveless, upper floret with lemma reduced to hyaline stipe passing into slender awn, palea minute or absent; pedicellate spikelet with 1 floret, or sometimes floret absent, floret when present male or sterile, lemma if present hyaline.

About 20 species, tropical and warm temperate areas of Africa, Asia and Australia; 10 species Australia; 8 species south-eastern Queensland.

1. Lower glumes of sessile spikelets with sub-apical fringe of long
tubercular-based hairs 2
- Lower glumes of sessile spikelets without sub-apical fringe of long
tubercular-based hairs 3
2. Sessile spikelets *ca* 4 mm long 1. *D. sericeum*
- Sessile spikelets 4.5–6 mm long 4
3. Upper glumes with ciliate margin 2. *D. fecundum*
- Upper glumes not ciliate on margin 3. *D. setosum*
4. Racemes sessile, usually solitary, occasionally 2 or 3 5
- Racemes pedunculate, usually 2 or more 6
5. Sessile spikelets 3–6 mm long 4. *D. tenue*
- Sessile spikelets 7.5–8.5 mm long 5. *D. queenslandicum*
6. Peduncles of racemes hairy 6. *D. aristatum*
- Peduncles glabrous 7
7. Lower glume with long usually tubercular-based hairs on margin 7. *D. annulatum*
- Lower glume ciliate on margin, or with few long tubercular-based hairs
near apex 8
8. Pedicellate spikelets 5.5–6.5 mm long, often awned 2. *D. fecundum*
- Pedicellate spikelets 3–5 mm long, not awned 8. *D. caricosum*

1. Dichanthium sericeum (R. Br.) A. Camus QUEENSLAND BLUEGRASS
Andropogon sericeus R. Br.; *A. sericeus* var. *typicus* Domin; *Dichanthium affine* (R. Br.)
A. Camus

Perennial, tufted, erect, up to *ca* 80 cm tall; culms unbranched or with few branches, nodes bearded. Leaf sheaths glabrous or with few tubercular-based hairs; ligules *ca* 1 mm long; leaf blades linear, apex attenuate, up to *ca* 18 cm × 0.2–0.45 cm, glabrous or sometimes with sparse to dense tubercular-based hairs. Racemes 1–6, 1–7 cm long, rachis

and pedicels with long whitish or brownish hairs; sessile spikelet *ca* 4 mm long, lower glume \pm as long as spikelet, shortly hairy in lower part, long ciliate on upper margin, with transverse sub-apical fringe of long tubercular-based hairs, upper glume as long as spikelet, glabrous, lower floret with lemma *ca* 1–2.5 mm long, upper floret with lemma and awn together *ca* 2.5 cm long; pedicellate spikelet *ca* 3 mm long.

Widespread and moderately common in the region, usually on heavy soils. Considered to be a good fodder grass.

2. *Dichanthium fecundum* S. T. Blake **CURLY BLUEGRASS; GULF BLUEGRASS**
Perennial, tufted, up to *ca* 80 cm tall; culms often branched, nodes glabrous or bearded. Leaf sheaths glabrous or with few hairs on margin towards top; ligules *ca* 0.5–1.5 mm long; leaf blades linear, apex attenuate, up to *ca* 25 cm \times 0.25–0.5 cm, glabrous or with few tubercular-based hairs, margin scabrous. Racemes 1–6, 4–6 cm long, rachis and pedicels with long hairs; sessile spikelets 4.5–5.5 mm long, lower glume as long as spikelet, with long hairs in lower part, ciliate on margin, glabrous in upper part except for few tubercular-based hairs near apex, upper glume *ca* as long as spikelet, glabrous except for ciliate margin, lower floret with lemma *ca* $\frac{1}{3}$ – $\frac{2}{3}$ length of spikelet, upper floret with lemma and awn together 1.5–2.8 cm long; pedicellate spikelet 5.5–6.5 mm long, often awned.

Known in the region from a few localities in the Burnett district.

3. *Dichanthium setosum* S. T. Blake
Perennial, erect, up to *ca* 70 cm tall; culms unbranched, nodes usually bearded. Leaf sheaths glabrous except near junction with blade; ligules less than 1 mm long; leaf blades linear, apex attenuate, up to *ca* 15 cm \times 0.2–0.4 cm, glabrous or with long tubercular-based hairs. Racemes 1–2, rarely 3, 3.5–8 cm long, rachis and pedicels with long hairs; sessile spikelet 5–6 mm long, lower glume as long as spikelet, with long hairs in lower part, upper part long ciliate on margin and with transverse sub-apical fringe of long tubercular-based hairs, upper glume as long as spikelet, glabrous, scabrid on lateral nerves, lower floret with lemma *ca* 2 mm long, upper floret with lemma and awn together *ca* 2.5 cm long; pedicellate spikelet *ca* 5–5.5 mm long, lemma of upper floret sometimes with awn up to 6 mm long.

Recorded in the region from Mt Mistake in southern Moreton district.

4. *Dichanthium tenue* (R. Br.) A. Camus **SMALL BLUEGRASS**
Andropogon tenuis R. Br.

Perennial, erect, up to *ca* 70 cm tall; culms unbranched, nodes usually bearded. Leaf sheaths glabrous or with few tubercular-based hairs; ligules *ca* 1 mm long; leaf blades linear, apex attenuate, up to *ca* 18 cm \times 0.15–0.4 cm, glabrous or with few hairs. Racemes 1–3, 3–6 cm long, rachis and pedicels with long hairs; sessile spikelet 3–6 mm long, lower glume as long as spikelet, hairy in lower part, glabrous above, ciliate on margin, upper glume as long as spikelet, glabrous, lower floret with lemma slightly shorter than spikelet, upper floret with lemma and awn together *ca* 1.8–2.8 cm long; pedicellate spikelet *ca* as long as sessile spikelet.

Widespread in the region but not common.

5. *Dichanthium queenslandicum* B. Simon
Perennial, tufted, erect, up to *ca* 80 cm tall; culms rarely branched, nodes bearded. Leaf sheaths with long spreading tubercular-based hairs; ligules up to *ca* 1.5 mm long; leaf blades linear, apex attenuate, up to *ca* 18 cm \times 0.25–0.5 cm, with long spreading tubercular-based hairs. Racemes solitary, rarely paired, up to *ca* 10 cm long, rachis and pedicels with long spreading hairs; sessile spikelet 7.5–8.5 mm long, lower glume as long as spikelet, glabrous, scabrid on margin, upper glume as long as spikelet, glabrous, lower floret with lemma *ca* 5 mm long, hyaline, upper floret with lemma and awn together 2–2.5 cm long; pedicellate spikelet *ca* 6 mm long. **Fig. 39E.**

Known in the region from northern Darling Downs district, on heavy black soils; rare.



Fig. 39 POACEAE — **A** *Elionurus citreus*, spikelet x 4; **B** *Rottboellia cochinchinensis*, inflorescence x 1; **C** *Sorghum leiocladum*, sessile and pedicellate spikelets x 4; **D**₁–**D**₂ *Bothriochloa bunyensis*, **D**₁ inflorescence x 1, **D**₂ sessile and pedicellate spikelets x 4; **E**₁–**E**₂ *Dichanthium queenslandicum*, **E**₁ inflorescence x 1, **E**₂ sessile and pedicellate spikelets x 4.

6. **Dichanthium aristatum* (Poir.) C. E. Hubbard**ANGLETON GRASS***Andropogon aristatus* Poir.

Perennial, tufted, erect or ascending, up to 1 m tall; culms unbranched or with few branches, nodes glabrous or bearded. Leaf sheaths glabrous or with few hairs at junction with blade; ligules short; leaf blades linear, attenuate, up to *ca* 25 cm \times 0.3–0.6 cm, glabrous or with sparse to dense tubercular-based hairs. Racemes mostly 1–6, 2–8 cm long, peduncles with long soft hairs, rachis and pedicels hairy; sessile spikelet 2–5 mm long, lower glume as long as spikelet, with long hairs in lower part, glabrous above except near apex, usually ciliate on margin, upper glume as long as spikelet, glabrous except for ciliate margin, lower floret with lemma slightly shorter than spikelet, upper floret with lemma and awn together 1.5–2 cm long; pedicellate spikelet *ca* as long as sessile spikelet.

Native of India and south-eastern Asia; probably introduced as a pasture plant, naturalized and widespread in the region.

7. **Dichanthium annulatum* (Forssk.) Stapf**SHEDA GRASS***Andropogon annulatus* Forssk.

Perennial, tufted, decumbent to ascending, up to *ca* 1 m tall but often much less; culms unbranched or branched, nodes glabrous or bearded. Leaf sheaths glabrous or with hairs on margin; ligules short; leaf blades linear, attenuate, up to *ca* 20 cm \times 0.2–0.7 cm, glabrous or with few tubercular-based hairs. Racemes mostly 1–6, sometimes more, 1–6 cm long, rachis and pedicels ciliate on margin; sessile spikelet mostly 3–5 mm long, lower glume as long as spikelet, with long hairs on margin, upper hairs usually tubercular-based, upper glume *ca* as long as spikelet, glabrous, lower floret with lemma slightly shorter than spikelet, upper floret with lemma and awn together 1–1.5 cm long; pedicellate spikelet *ca* as long as sessile spikelet.

Collected from around Ipswich in the Moreton district and from near Bundaberg in the Wide Bay district.

8. **Dichanthium caricosum* (L.) A. Camus*Andropogon caricosus* L.

Perennial, tufted, decumbent to \pm erect, up to *ca* 1 m tall; culms unbranched or branched, nodes glabrous. Leaf sheaths glabrous; ligules *ca* 1.5 mm long; leaf blades linear, apex attenuate, up to *ca* 20 cm \times 0.2–0.7 cm, glabrous, margin spinulose-scabrous. Racemes 1–10, 3–7.5 cm long, rachis and pedicels with few long hairs; sessile spikelet 3–5 mm long, lower glume as long as spikelet, with long hairs in lower part, glabrous above except for margin and near apex, upper glume *ca* as long as spikelet, glabrous, lower floret with lemma somewhat shorter than spikelet, upper floret with lemma and awn together 1.5–2 cm long; pedicellate spikelet *ca* as long as sessile spikelet.

Native of India and south-eastern Asia; probably introduced as a pasture grass, possibly naturalized in north-eastern Moreton district.

113. ARTHRAXON Beauv.

Annuals or perennials, usually slender. Ligules membranous; leaf blades narrowly ovate, base cordate and stem-clasping. Inflorescences of subdigitate racemes, spikelets in pairs, one sessile and one pedicellate, sometimes pedicellate spikelet reduced to pedicel or absent; spikelets with 2 florets, lower floret reduced to lemma, upper bisexual in sessile spikelet, male or sterile in pedicellate spikelets; sessile spikelet with glumes equal in length, lower floret with lemma hyaline, upper floret with lemma hyaline, often awned, palea minute; pedicellate spikelet when present awnless.

About 25 species, tropical and subtropical regions of Africa and Asia to Australia; 2 species Australia; 1 species south-eastern Queensland.

1. *Arthraxon hispidus* (Thunb.) Makino*Phalaris hispida* Thunb.; *Arthraxon ciliare* Beauv.; *A. ciliare* var. *australe* Benth.

Decumbent, rooting at nodes; flowering culms ascending and up to *ca* 60 cm tall, nodes hairy. Leaf sheaths with stiff spreading tubercular-based hairs; ligules short, ciliate; leaf

blades narrowly ovate, apex acuminate, base cordate and stem-clasping, 2–6 cm \times 0.7–1.5 cm, glabrous or with tubercular-based hairs, margin scabrid or ciliate. Racemes 1–5, mostly 2–4 cm long; sessile spikelet 4–5 mm long, lower glume as long as spikelet, *ca* 9-nerved with tubercular-based bristles on nerves, upper glume scabrid on keel, lemma of lower and upper florets *ca* $\frac{1}{2}$ – $\frac{2}{3}$ length of spikelet, lemma of upper floret with awn *ca* 4–5 mm long; pedicellate spikelet reduced to pedicel or absent. **Fig. 40A.**

Found in eastern parts of the region, often in damp shady places.

114. SCHIZACHYRIUM Nees

Annuals or perennials. Ligules membranous or scarious; leaf blades flat or folded. Inflorescences of single racemes arranged in spatheate false panicles or sometimes racemes solitary on culms, spikelets in pairs differing in sex and usually shape and size, one spikelet sessile, one pedicellate; spikelets with 2 florets, lower floret reduced to lemma, upper bisexual in sessile spikelet, male or sterile or absent in pedicellate spikelet; sessile spikelet with glumes \pm equal in length, lower floret with lemma hyaline, upper floret with lemma 2-lobed with awn arising in sinus, palea minute or absent; pedicellate spikelet usually broader and flatter than sessile spikelet or \pm reduced, often awned.

About 50 species from tropical parts of the world; 7 species Australia; 2 species south-eastern Queensland.

1. Lower glumes of sessile spikelets winged at least above middle; racemes usually conspicuously silky hairy

1. *S. fragile*

Lower glumes of sessile spikelets not winged; racemes not silky hairy

2. *S. pseudoulalia*

1. *Schizachyrium fragile* (R. Br.) A. Camus FIREGRASS; RED SPATHE GRASS

Andropogon fragilis R. Br.; *Schizachyrium obliqueberbe* (Hackel) A. Camus

Annual, tufted, erect, up to *ca* 75 cm tall; culms mostly unbranched, nodes glabrous. Leaf sheaths glabrous or with hairs at base or apex; ligules *ca* 0.5 mm long, densely ciliate; leaf blades linear, flat or folded, apex attenuate, up to *ca* 10 cm \times 0.1–0.2 cm, glabrous, minutely scabrous above. Racemes solitary, 2.5–4.5 cm long, at first enclosed in leafy spathe, at length exerted, rachis and pedicels flattened, bearded on one side; sessile spikelet 6–7 mm long, lower glume as long as spikelet, narrowly winged on keel in upper part, villous on back in lower half, glabrous above, upper glume slightly shorter than spikelet, lower floret with lemma *ca* $\frac{3}{4}$ length of spikelet, upper floret with lemma slightly shorter than lemma of lower floret, cleft almost to base, awn up to *ca* 1.5 cm long; pedicellate spikelet reduced to narrow pointed glume 1–2 mm long, produced into awn 3–4 mm long.

Widespread in the region but not common. Of little use as a forage species.

2. *Schizachyrium pseudoulalia* (Hosokawa) S. T. Blake

Microstegium pseudoulalia Hosokawa

Annual, tufted, decumbent or spreading, up to *ca* 90 cm tall; culms branched, nodes glabrous. Leaf sheaths glabrous or pubescent at apex; ligules 0.2–1.3 mm long; leaf blades linear, flat or sometimes folded, apex obtuse to subacute, glabrous, margin scabrous at least near tip. Racemes solitary, up to *ca* 6 cm long, at least partly enclosed in leafy spathe, rachis and pedicels flattened, with few long hairs in lower part or \pm glabrous; sessile spikelet 4–8 mm long, lower glume \pm as long as spikelet, not winged, glabrous or densely hairy in lower part, upper glume as long as spikelet, lower floret with lemma *ca* $\frac{3}{5}$ – $\frac{4}{5}$ as long as spikelet, upper floret with lemma *ca* as long as lemma of lower floret, deeply cleft, awn 1–3 cm long; pedicellate spikelet reduced to glume 1–1.7 mm long, produced into awn 0.3–1.4 cm long.

Collected once in the region, from near Bundaberg in the Wide Bay district.

115. ANDROPOGON L.

Annuals or perennials. Ligules membranous or reduced to ciliate rim; leaf blades mostly flat. Inflorescences of paired or digitate or subdigitate racemes or collected into spatheate

false panicle; spikelets paired, one spikelet sessile, one spikelet pedicellate; spikelets with 2 florets, lower floret reduced to lemma, upper bisexual in sessile spikelet, male or sterile or absent in pedicellate spikelet; sessile spikelets with glumes \pm equal, lower glume 2-keeled, upper glume \pm boat-shaped, lower floret with lemma hyaline, upper floret with lemma 2-toothed with awn arising between teeth, palea small or absent; pedicellate spikelet often different in shape from sessile one, sometimes much reduced or absent.

About 100 species throughout the tropics; 1 species naturalized Australia, occurring in south-eastern Queensland.

1. **Andropogon virginicus* L.

WHISKY GRASS; BROOMSEDGE

Perennial, tufted, erect, up to *ca* 1 m tall; culms branched at upper nodes to form compound false panicle, nodes glabrous. Leaf sheaths compressed, glabrous except on margin; ligules very short; leaf blades linear, flat or folded, apex attenuate, up to 20 cm \times 0.2–0.4 cm, glabrous or with long hairs on margin especially towards base. Racemes in leafy spathes in false panicles, racemes 2 or 4 together, mostly 2–3 cm long, rachis and pedicels with dense long hairs much exceeding spikelets; sessile spikelet *ca* 3 mm long, lower glume as long as spikelet, scabrid on upper part of keel, upper glume as long as spikelet, lower floret with lemma slightly shorter than spikelet, upper floret with lemma slightly shorter than lemma of lower floret and with awn *ca* 1.5–2 cm long, palea minute; pedicellate spikelet reduced to pedicel.

Native of America; naturalized in a few places in eastern Moreton district and also from near Stanthorpe in southern Darling Downs district.

116. CYMBOPOGON Sprengel

Perennials, rarely annuals, usually robust. Ligules membranous or scarious; leaf blades flat, recurved or folded. Inflorescences of paired racemes \pm enclosed in leafy spathe, these crowded into a leafy false panicle, spikelets paired, those of each pair differing in sex and usually shape, one spikelet sessile, one pedicellate; spikelets with 2 florets, lower floret reduced to lemma, upper bisexual in sessile spikelet, male or rarely sterile in pedicellate spikelet; sessile spikelet with glumes \pm equal, lower glume often with oil glands, shallowly concave or grooved on back, 2-keeled, keels often winged, upper glume \pm boat-shaped, lemma of lower floret hyaline, lemma of upper floret 2-fid or 2-lobed, often awned from sinus; pedicellate spikelet as long as or shorter than sessile spikelet, lower glume not concave or grooved on back.

About 40 species, tropical and subtropical regions of Africa, Asia and Australia; 9 species Australia; 4 species south-eastern Queensland.

- | | |
|--|-----------------------------|
| 1. Rachis and pedicels of racemes hairy all over or over most of area,
hairs 4–7 mm long | 2 |
| Rachis and pedicels of racemes glabrous or hairy on margins only, hairs
up to 3 mm long | 3 |
| 2. Leaf sheaths up to 6 mm wide, recurved or rolled back at maturity;
lower glume deeply concave on back, nerveless | 1. <i>C. bombycinus</i> |
| Leaf sheaths 2–3 mm wide, straight or inrolled or flexuous at maturity;
lower glume concave only at base, 2-nerved | 2. <i>C. obtectus</i> |
| 3. Sessile spikelets with awn up to 1.2 cm long; callus below sessile
spikelet bearded | 3. <i>C. queenslandicus</i> |
| Sessile spikelets not awned or rarely awned and then awn imperfect;
callus below sessile spikelet not bearded | 4. <i>C. refractus</i> |

1. *Cymbopogon bombycinus* (R. Br.) Domin

SILKY OILGRASS

Andropogon bombycinus R. Br.; *A. lanatus* R. Br.; *Cymbopogon procerus* (R. Br.) Domin var. *schultzii* (Hackel) Domin; *C. exaltatus* (R. Br.) Domin var. *lanatus* (R. Br.) Domin; *C. bombycinus* var. *townsvillensis* Domin; *C. lanatus* (R. Br.) Roberty; *C. schultzii* (Hackel) Roberty

Perennial, erect, up to *ca* 1.2 m tall; culms mostly unbranched except in fertile region,

nodes densely pubescent. Leaf sheaths mostly glabrous or basal ones pubescent; ligules up to *ca* 6.5 mm long; leaf blades linear, apex attenuate, up to *ca* 40 cm \times 0.1–0.4 cm, glabrous, minutely scabrous. False panicles up to *ca* 40 cm long, racemes up to *ca* 2 cm long, rachis and pedicels densely hairy, hairs up to 6 mm long; sessile spikelet 4–6 mm long, lower glume as long as spikelet, glabrous to densely pubescent, upper glume as long as spikelet, \pm pubescent, upper floret with lemma *ca* 3 mm long with awn up to *ca* 2 cm long; pedicellate spikelet 3.5–4.5 mm long.

Known from the Burnett district and nearby parts of the Wide Bay and Darling Downs districts, usually on sandy or stony soils.

2. *Cymbopogon obtectus* S. T. Blake

SILKYHEADS

Perennial, erect, up to 1 m tall; culms unbranched below inflorescence, nodes glabrous or with minute appressed hairs at base. Ligules up to 5 mm long; leaf blades linear, apex attenuate, up to 35 cm \times 0.1–0.4 cm, glabrous or sometimes pubescent at base, minutely scabrous. False panicles up to 25 cm long, racemes up to *ca* 2.5 cm long, rachis and pedicels densely hairy, hairs up to 7 mm long; sessile spikelet 5–6.5 mm long, lower glume as long as spikelet, glabrous, upper glume as long as spikelet, glabrous, upper floret with lemma 3.5–4.5 mm long with awn 6–10 mm long; pedicellate spikelet 3.5–5 mm long.

Known from the Burnett, Darling Downs and western Moreton districts, usually on sandy or stony soils.

3. *Cymbopogon queenslandicus* S. T. Blake

Perennial, \pm erect, up to 1.5 m tall; culms unbranched below inflorescence, nodes glabrous to pubescent. Leaf sheaths glabrous to pubescent; ligules up to 5 mm long; leaf blades linear, apex attenuate, up to 50 cm \times 0.25–1 cm, scabrous. False panicles up to *ca* 45 cm long, racemes *ca* 2 cm long, rachis and pedicels densely hairy, hairs up to 3 mm long; sessile spikelet 4.5–6 mm long, lower glume as long as spikelet, glabrous, upper glume as long as spikelet, glabrous, upper floret with lemma *ca* 4 mm long with awn up to 1.2 cm long; pedicellate spikelet 4.5–6 mm long.

Known from a few records from central Burnett district and western Wide Bay district, usually on rocky hillsides.

4. *Cymbopogon refractus* (R. Br.) A. Camus

BARB WIRE GRASS

Andropogon refractus R. Br.; *A. refractus* var. *luxurians* Domin; *A. refractus* var. *tropicus* Domin

Perennial, erect or ascending, up to 1.5 m tall; culms unbranched below inflorescence, nodes glabrous or with minute appressed hairs. Leaf sheaths glabrous or basal ones silky pubescent at base; ligules up to *ca* 2 mm long; leaf blades linear, apex attenuate, up to 40 cm \times 0.1–0.4 cm, minutely scabrous below. False panicles up to 45 cm long, racemes up to *ca* 2 cm long, rachis and pedicels with few hairs, hairs up to 1.5 mm long; sessile spikelet 5–6.5 mm long, lower glume as long as spikelet, glabrous, upper glume as long as spikelet, glabrous, upper floret with lemma *ca* 2.5–3.5 mm long with awn absent or imperfect. **Fig. 40B.**

Widespread and common in the region, in a variety of situations. Apparently not highly palatable to stock.

117. *HYPARRHENIA* Anderss. ex Fourn.

Annuals or perennials. Ligules scarious; leaf blades flat or revolute. Inflorescences of a pair of racemes borne on slender peduncle and subtended by leaf-like spathe, the raceme pairs collected into false panicles, spikelets paired, one spikelet sessile, one pedicellate; spikelets with 2 florets, lower floret reduced to lemma, upper bisexual in upper sessile spikelets, sterile in others, male or sterile in pedicellate spikelets; fertile sessile spikelet with glumes equal in length, lower floret with lemma 2-nerved or nerveless, upper floret

with lemma 2-toothed and with hairy awn arising in sinus of teeth, palea usually absent; sterile sessile spikelet without awn; pedicellate spikelet usually slightly longer than sessile spikelet, lower glume sometimes with bristle-like awn, lemma of upper floret awnless.

About 50 species, mainly Africa with few species in other tropical or warm temperate regions; 4 species Australia; 3 species south-eastern Queensland.

- | | | |
|--|--------------------------|---|
| 1. Spikelets covered with reddish brown hairs | 1. <i>H. rufa</i> | |
| Spikelets glabrous or with whitish hairs | | 2 |
| 2. Raceme pairs each with 2-4 awned spikelets; lower glume of pedicellate spikelet with bristle-like awn 1-6 mm long | 2. <i>H. filipendula</i> | |
| Raceme pairs each with 8-13 awned spikelets; lower glume of pedicellate spikelet with bristle-like awn | 3. <i>H. hirta</i> | |

1. **Hyparrhenia rufa* (Nees) Stapf

THATCH GRASS

Trachypogon rufus Nees

Perennial or sometimes annual, tufted, erect, up to *ca* 2.5 m tall; culms sparsely branched, nodes glabrous. Leaf sheaths glabrous; ligules *ca* 2-3 mm long; leaf blades linear, apex attenuate, up to 60 cm × 0.2-0.8 cm, glabrous or with few long hairs. False panicles up to 80 cm long, racemes 2-25 cm long, each raceme pair with 9-14 awns; sessile spikelet 3-5 mm long, lower glume as long as spikelet, with long red-brown hairs, upper margin ciliate, upper glume sometimes ciliate upwards, lower floret with lemma with or without cilia, upper floret with lemma stipe-like with awn 2-3 cm long; pedicellate spikelet 3-5 mm long, not awned.

Native of Africa; introduced to Australia, naturalized in eastern parts of the region.

2. *Hyparrhenia filipendula* (Hochst.) Stapf

TAMBOOKIE GRASS

Andropogon filipendulus Hochst.; *A. filipendulus* var. *lachnatherus* (Benth.) Hackel; *Hyparrhenia filipendula* var. *pilosa* (Hochst.) Stapf

Perennial, tufted, shortly rhizomatous, erect, up to 1.5 m tall; culms mostly branched, nodes glabrous. Leaf sheaths usually glabrous; ligules *ca* 1 mm long; leaf blades linear, apex attenuate, up to 30 cm × 0.15-0.5 cm, glabrous or hirsute especially towards base. False panicles up to *ca* 90 cm long, racemes 1-1.5 cm long, each raceme pair with 2-4 awns; fertile spikelet 6-8 mm long, lower glumes as long as spikelet, glabrous or with long ± spreading hairs, upper glume ciliate upwards, lower floret with lemma ciliate, upper floret with lemma stipe-like and produced into awn 4-5 cm long, palea absent; pedicellate spikelet 6-7 mm long, lower glume with bristle-like awn 1-6 mm long.

Widespread and common in the Moreton district, also recorded from the Burnett and Wide Bay districts but less common. Of some value as a fodder grass.

3. **Hyparrhenia hirta* (L.) Stapf

TAMBOOKIE GRASS; COOLATI GRASS

Andropogon hirtus L.; *Hyparrhenia quarrei* Robyns

Annual, tufted, shortly rhizomatous, erect, up to *ca* 1 m tall; culms sometimes branched, nodes glabrous. Leaf sheaths usually glabrous; ligules 2-4 mm long; leaf blades linear, apex attenuate, up to 30 cm × 0.1-0.3 cm, glabrous or with few scattered long hairs. False panicles up to 30 cm long, racemes 1.5-4 cm long, each raceme pair with 8-13 awned spikelets; fertile spikelet 4-6.5 mm long, lower glume as long as spikelet, villous, upper glume ciliate, lower floret with lemma ciliate, upper floret with lemma stipe-like and produced into awn 1.5-2.5 cm long, column with pale brownish hairs, palea minute or absent; pedicellate spikelet 4-6.5 mm long, awnless, villous.

Native of Africa and the Mediterranean Region; naturalized in the region in a variety of habitats.

118. HETEROPOGON Pers.

Annuals or perennials. Ligules membranous; leaf blades flat or folded. Inflorescences single terminal racemes sometimes loosely aggregated into false panicles, spikelets in pairs, those of lower $\frac{1}{4}$ - $\frac{2}{3}$ of raceme alike in sex and shape, those of upper part of raceme dissimilar, one of each pair sessile, fertile and awned, other pedicellate, male or

sterile and awnless; spikelets with 2 florets, lower floret reduced to empty lemma, upper female or bisexual in awned sessile spikelets, male or sterile in all other spikelets; awned sessile spikelets with glumes equal in length, lower floret with lemma hyaline, nerveless, upper floret with lemma stipe-like, with geniculate awn, palea small or absent; other spikelets usually slightly asymmetrical and often twisted.

About 12 species, tropical and subtropical parts of the world; 2 species Australia, both occurring in south-eastern Queensland.

1. Awned spikelets 0.5–0.8 cm long; other spikelets 0.6–1 cm long; robust plants usually over 1 m tall

Awned spikelets 0.9–1.4 cm long; other spikelets 1.4–2.5 cm long; plants usually less than 1 m tall
1. *H. triticeus*

2. *H. contortus*

1. ***Heteropogon triticeus* (R. Br.) Stapf**

GIANT SPEARGRASS

Andropogon triticeus R. Br.; *Heteropogon insignis* Thwaites
Perennial, tufted, robust, erect, up to ca 3 m tall; culms usually branched, nodes glabrous. Leaf sheaths glabrous; ligules 1–4 mm long, ciliate; leaf blades linear, apex attenuate, up to ca 100 cm × 0.5–2.2 cm, glabrous or with scattered tubercular-based hairs. Racemes mostly 10–15 cm long; awned sessile spikelets 0.9–1.4 cm long, glumes with short brown hairs, awns 10–15 cm or more long, column twisted and pubescent; other spikelets 1.4–2.5 cm long, outer glume glabrous.

Known in the region from a few collections in the Moreton and Wide Bay districts.

2. ***Heteropogon contortus* (L.) Beauv. ex Roemer & Schultes**

BUNCH SPEARGRASS;
BLACK SPEARGRASS

Andropogon contortus L.
Perennial, tufted, erect, or ascending, up to 1 m tall; culms unbranched or branched, nodes glabrous. Leaf sheaths glabrous or with few tubercular-based hairs; ligules 1–2 mm long, ciliate; leaf blades linear, apex attenuate, up to 25 cm × 0.2–0.7 cm, glabrous or with scattered tubercular-based hairs. Racemes 3–7 cm long; awned sessile spikelets 5–8 mm long, glumes clothed with short brown hairs, awn 5–12 cm long with column twisted and pubescent; other spikelets 6–10 mm long, with spreading tubercular-based hairs or glabrous. **Fig. 40F.**

Widespread in the region, usually in open woodland areas. Readily eaten by stock when young. The spikelets becomes caught in the wool of sheep and can penetrate the skin eventually proving fatal. The spikelets can also cause eye disorders in stock.

119. **THEMEDA** Forssk.

Annuals or perennials. Ligules short, membranous; leaf blades flat or folded. Inflorescences of racemes enclosed in sheathing spathes, these solitary or in clusters and gathered into leafy false panicles, spikelets in pairs, those of lower 2 pairs sessile and alike in sex and shape and forming involucre around upper pairs, upper 1–4 pairs consisting of one sessile and one pedicellate spikelet; spikelets with 2 florets, lower floret reduced to empty lemma, upper bisexual in upper sessile spikelets, male or sterile in other spikelets; upper sessile spikelets with glumes equal, lower floret with lemma nerveless, lemma of upper floret stipe-like and, in Australian species, passing into geniculate awn, palea small or absent; lower sessile spikelets compressed, awnless, lower glume usually herbaceous; pedicellate spikelets similar to lower sessile spikelets but narrower.

About 19 species, tropical and subtropical regions of Africa, Asia and Australia; 4 species Australia; 3 species south-eastern Queensland.

1. Involucral spikelets 2–3 cm long

Involucral spikelets 0.6–1.4 cm long
1. *T. avenacea*

2
2. Involucral spikelets 0.8–1.4 cm long; perennials

Involucral spikelets 0.6–0.7 cm long; annuals
2. *T. triandra*

3. *T. quadrivalvis*

1. *Themeda avenacea* (F. Muell.) Th. Dur. & B. D. Jackson NATIVE OATGRASS
Anthistiria avenacea F. Muell.

Perennial, tufted, erect, up to 2 m tall; culms with few branches, nodes glabrous or rarely pubescent. Lower leaf sheaths woolly, upper sheaths glabrous; ligules fringed with hairs 2–7 mm long; leaf blades narrowly linear, apex attenuate, variable in length, up to ca 100 cm × 0.1–0.2 cm, ± scabrous. False panicles up to 1 m long, spathes 3–9 cm long, racemes usually many; involucre spikelets 2–3 cm long, lower glume as long as spikelet, usually ± scabrid, upper glume shorter, ciliate upwards; upper sessile spikelets 1 or 2, 1.3–1.7 cm long, lower glume as long as spikelet, densely brownish villous, upper glume ± as long as spikelet, densely villous except for glabrous wing-like margin, upper floret with lemma and awn together 4–10 cm long; pedicellate spikelets ca 5 mm long.

Western parts of the region. Apparently a useful fodder grass in dry areas where it occurs.

2. *Themeda triandra* Forssk. KANGAROO GRASS
Themeda australis (R. Br.) Stapf; *Anthistiria ciliata* auct. non L., Benth.

Perennial, tufted, erect, up to ca 1.2 m tall; culms branched or unbranched, nodes glabrous to pubescent. Leaf sheaths glabrous or with scattered hairs; ligules short, ciliate; leaf blades linear, apex attenuate, up to ca 50 cm × 0.2–0.5 cm, usually glabrous or occasionally with few tubercular-based hairs. False panicles usually reddish, up to ca 35 cm long, spathes 1.5–6 cm long, racemes few-many; involucre spikelets 8–10 mm long, lower glume glabrous or with scattered tubercular-based hairs, upper glume usually finely ciliate; upper sessile spikelets 1 or 2, ca 8 mm long, lower glume as long as spikelet, hairy above middle, lower glume slightly shorter than upper glume, upper floret with lemma and awn together up to ca 6 cm long; pedicellate spikelets 7–9 mm long. **Fig. 40C.**

Widespread throughout the region, usually in open woodlands. It is readily eaten by stock.

3. **Themeda quadrivalvis* (L.) Kuntze GRADER GRASS
Andropogon quadrivalvis L.

Annual, tufted, erect, up to ca 1.8 m tall; culms stout, not or sparsely branched, nodes glabrous. Leaf sheaths glabrous; ligules 2–3 mm long; leaf blades linear, apex attenuate, up to ca 30 cm × 0.4–0.7 cm, glabrous or with few tubercular-based hairs. False panicles usually reddish, up to ca 60 cm long, spathes 1.2–2 cm long, racemes numerous; involucre spikelets ca 6–7 mm long, glumes as long as spikelet, usually with few tubercular-based bristly hairs; upper sessile spikelets 4–5 mm long, lower glume as long as spikelet, with stout hairs in upper part, upper glume slightly shorter, with stout hairs in upper part, upper floret with lemma and awn together 3.5–4.5 cm long; pedicellate spikelets ca 5 mm long, glabrous.

Native of India; naturalized and widespread in the Moreton and Wide Bay districts, also recorded from the Burnett district, often alongside roads.

120. ISEILEMA Anderss.

Annuals or occasionally perennials. Ligules membranous; leaf blades flat or folded. Inflorescences of racemes each subtended by small spathe, groups of racemes subtended by larger leafy spathe forming leafy false panicle, each raceme consisting of 4 male or sterile pedicellate spikelets forming an involucre around a triplet of a sessile bisexual spikelet and 2 pedicellate male or sterile spikelets; involucre spikelets equal, compressed; fertile sessile spikelet differing in size and form from other spikelets, glumes subequal, leathery or hardened, lower glume often 2-toothed, lower floret with lemma ca $\frac{2}{3}$ length of spikelet, palea absent, upper floret with stipe-like lemma passing into slender geniculate awn, palea absent; upper pedicellate spikelets on filiform pedicels, often finer than involucre spikelets.

About 20 species, India, south-eastern Asia and Australia; 14 species Australia; 1 species south-eastern Queensland.



Fig. 40 POACEAE — A₁–A₂ *Arthraxon hispidus*, A₁ inflorescence x 1, A₂ spikelet x 6; B *Cymbopogon refractus*, inflorescence x 1; C *Themeda triandra*, raceme x 1½; D₁–D₂ *Iseilema membranaceum*, D₁ inflorescence x 1, D₂ raceme x 6; E *Chionachne cyathopoda*, inflorescence x 1; F *Heteropogon contortus*, inflorescence x 1.

1. *Iseilema membranaceum* (Lindl.) Domin**SMALL FLINDERS GRASS**

Anthistiria membranacea Lindl.; *Iseilema actinostachys* Domin

Annual, loosely tufted, erect or ascending, up to *ca* 40 cm tall, rarely taller; culms not or sparsely branched, nodes glabrous. Leaf sheaths flattened, glabrous; ligules 0.5–1 mm long; leaf blades often reddish with age, linear, folded at first, at length flat, apex acute, 2–20 cm × 0.2–0.5 cm, glabrous. False panicles up to 18 cm or more long, spathes 0.8–1.2 cm long; involucre spikelets 3–4 mm long on slender pedicels 1.5–2 mm long, connate at base and with hairs up to 2 mm long, rarely glabrous; sessile spikelet 5–6 mm long with awn up to 1.5 cm long; pedicellate upper spikelets 2–3.5 mm long on filiform pedicels 2.5–3 mm long. **Fig. 40D.**

Known from the Darling Downs district and extreme western Moreton district. Considered a valuable fodder grass in dry areas.

121. CHIONACHNE R. Br.

Annuals or perennials. Ligules membranous; leaf blades flat. Inflorescences spike-like racemes at first enclosed in spathe at length fully exerted, sometimes forming loose panicles, spikelets unisexual, of 2 types according to sex, female spikelets few—several and at base of raceme, male spikelets numerous and in upper part of raceme; spikelets with 2 florets, female spikelets with upper floret fertile and lower floret reduced to lemma, male spikelets with both florets fertile; female spikelets often tightly overlapping, glumes dissimilar, palea present in fertile floret; male spikelets with glumes ± equal, palea present.

About 5 species, India, south-eastern Asia and Australia; 2 species Australia; 1 species south-eastern Queensland.

1. *Chionachne cyathopoda* (F. Muell.) F. Muell. ex Benth.**RIVER GRASS**

Sclerachne cyathopoda F. Muell.; *Polytoca cyathopoda* F. M. Bailey

Perennial, tufted, rhizomatous, erect, up to *ca* 3 m tall; culms unbranched or with few branches, nodes glabrous or with few hairs. Leaf sheaths mostly glabrous, occasionally with few tubercular-based hairs; ligules 1–1.5 mm long; leaf blades up to *ca* 90 cm × 0.8–3 cm, margin scabrous. Inflorescences solitary racemes up to 12 cm long; female spikelets solitary, tightly overlapping, ± clasping axis, *ca* 1.5 cm long, lower glume almost enclosing spikelet in clasping wings, apex with blunt tip, upper glume shorter than lower, pointed; male spikelets 0.8–1.2 cm long. **Fig. 40E.**

Occasionally found on the banks of creeks and rivers in the region.

***Parapholis incurva* (L.) C.E. Hubbard** (*Aegilops incurva* L.; *Lepturus incurvatus* Trin.; *Pholiurus incurvus* (L.) Schinz & Thell.), **COAST BARBGRASS**, has been recorded once in a Brisbane garden, reported to be growing in a garden with a plant from Adelaide, South Australia, with no record of its persisting. A native of Europe, North Africa and Asia, it has been reported naturalized in all southern Australian states, apparently growing particularly on areas of high salinity subject to occasional flooding.

Other grasses which are widely cultivated and which may persist or appear to have become naturalized include the following:

***Hordeum vulgare* L.**

***Saccharum officinarum* L.**

***Zea mays* L.**

***Secale cereale* L.**

BARLEY

SUGAR CANE

CORN; MAIZE

RYE

187. ARECACEAE

(PALMAE)

Woody plants, usually erect, sometimes thin, weak and climbing. Leaves in terminal cluster or in climbing species scattered; petioles usually sheathing at base; blades usually

pinnately or palmately split into segments, rarely simple or entire. Inflorescences (spadix) panicles or sometimes spike-like; flowers unisexual or bisexual; sepals 3; petals 3; ovary superior. Fruits berries or drupes.

About 200 genera with 2500 species from tropical and subtropical areas of the world; 22 genera with 57 species Australia; 4 genera with 5 species south-eastern Queensland.

- | | | | | | | |
|--|---|---|---|---|---------------------------|---|
| 1. Climbing palms; leaves scattered along stems | . | . | . | . | 1. <i>Calamus</i> | |
| Erect palms; leaves clustered at top of stems | . | . | . | . | . | 2 |
| 2. Leaves palmately divided | . | . | . | . | 2. <i>Livistona</i> | |
| Leaves pinnately divided | . | . | . | . | . | 3 |
| 3. Leaves 3–4 m long; inflorescences much divided | . | . | . | . | 3. <i>Archontophoenix</i> | |
| Leaves less than 2 m long; inflorescences undivided and spike-like | . | . | . | . | 4. <i>Linospadix</i> | |

1. CALAMUS L.

Dioecious; stems mostly weak and climbing, prickly. Leaves pinnately divided; rachis and sheath usually armed with prickles. Inflorescences arising within leaf sheath away from base of petiole, paniculate, spathes \pm tubular. Fruits globular, closely covered by shining scales (like lizard skin), usually 1-seeded.

About 375 species, mostly from tropical regions; 8 species Australia; 1 species south-eastern Queensland.

1. *Calamus muelleri* H. Wendl.

SOUTHERN LAWYER CANE; SOUTHERN
LAWYER VINE

Calamus muelleri var. *macrospermus* H. Wendl. & Drude

Stems climbing, up to 20 m long, up to 8 mm diameter, covered with appressed persistent leaf-sheaths. Leaf sheaths densely armed with prickles 3–10 mm long; blades 30–50 cm long; rachis armed on lower side with recurved prickles; leaf segments 10–16, 10–25 cm \times 1.5–2.5 cm, margin and sometimes undersurface with short fine prickles. Fruits yellowish, globular, *ca* 1.2 cm diameter.

Rainforests of the region, climbing to the tops of trees; often abundant. Flowers summer.

2. LIVISTONA R. Br.

Erect. Leaves fan-shaped; petioles long, \pm armed on margins; segments entire or bifid at apex. Inflorescences arising amongst leaves, usually large and much divided, spathes several, tubular; flowers bisexual. Fruits globular or ovoid.

28 species, Asia to Australia; *ca* 20 species Australia, 8 undescribed; 2 species south-eastern Queensland.

- | | |
|--|------------------------|
| 1. Leaf segments united at base, bifid at tip; spathes densely hairy | 1. <i>L. australis</i> |
| Leaf segments free almost to apex of petiole, deeply divided at tip, the divisions pendulous; spathes glabrous | 2. <i>L. decipiens</i> |

1. *Livistona australis* (R. Br.) Mart.

CABBAGE-TREE PALM

Corypha australis R. Br.

Trunk single, erect, up to 20(–30) m tall, 30–50 cm diameter. Leaves in dense crown; petioles 1.5–2.5 m long, spiny on margin mostly towards base; blades 1–2 m long, divided to middle or lower into many plicate segments, tips of segments entire or bifid. Inflorescences *ca* 1 m long; spathes densely hairy. Fruits red, changing to black, spherical, 1.5–1.8 cm diameter; seed 1.

Coastal areas in wet eucalypt forests and in or near rainforest; not common. Flowers summer. Cultivated both as a pot plant and as a garden plant in Australia and overseas.

2. *Livistona decipiens* Becc.

Trunk single, erect, up to *ca* 20 m tall, 25–30 cm diameter. Leaves in dense crown; petioles *ca* 1.5 m long, with few spines on margin; blades *ca* 1.8 m long, divided almost to apex of petiole into many plicate segments, tips of segments deeply divided, divisions

pendulous. Inflorescences *ca* 2 m long; spathes glabrous. Fruits spherical, 1.2–1.4 cm diameter.

Coastal areas from about Gympie northwards; not common. Flowers summer. Cultivated both as a pot plant and as a garden plant in Australia and overseas.

3. ARCHONTOPHOENIX H. Wendl. & Drude

Monoecious plants with solitary tall trunk. Leaves large; petioles sheathing at base; blades pinnately divided, segments numerous. Inflorescences axillary, but leaf falling before expansion of inflorescence, thus inflorescence appears to arise at base of crown, inflorescences compound, much branched, spathes 2-valved. Fruits subglobose or ellipsoid, pericarp thin and fleshy; seed 1.

2 species endemic in eastern Australia; 1 species south-eastern Queensland.

1. *Archontophoenix cunninghamiana* (H. Wendl.) H. Wendl. & Drude PICCABEEN PALM; BANGALOW PALM

Ptychosperma cunninghamiana H. Wendl.; *Seaforthia elegans* auct. non R. Br.

Trunk up to *ca* 20 m tall, up to *ca* 25 cm diameter. Petioles 20–25 cm long, sheathing base 70–90 cm long; leaf blades 3–4 m long, segments many, 60–90 cm \times 3–7 cm. Inflorescences 1–1.5 m long. Fruits red, subglobose, *ca* 1.5 cm diameter.

In or near rainforest of the region, especially in valleys and gullies. Flowers autumn. Cultivated as a pot plant and as a garden plant both in Australia and overseas.

4. LINOSPADIX H. Wendl.

Dwarf, unarmed, monoecious. Stems slender with leaves in terminal crown. Leaves pinnately divided. Inflorescences arising from amongst leaves, unbranched and spike-like; flowers numerous. Fruits small, obloid-ellipsoid, fleshy.

11 species, New Guinea and eastern Australia; 6 species Australia; 1 species south-eastern Queensland.

1. *Linospadix monostachya* (Mart.) H. Wendl. WALKING-STICK PALM *Areca monostachya* Mart.; *Kentia monostachya* (Mart.) F. Muell.; *Bacularia monostachya* (Mart.) F. Muell.

Stems single, 1.8–4(–5) m tall, 2–5 cm diameter. Leaves few; petioles up to 80 cm long, sheathing base *ca* 15 cm long, produced into 2 stipule-like lobes; leaf segments 10–30, up to 30 cm long. Inflorescences numerous, up to 1 m or more long. Fruits red, *ca* 1.2 cm long.

Moreton and Wide Bay districts, in rainforest; often abundant. Flowers found during most of the year. Cultivated to a limited extent as an ornamental both in Australia and overseas.

Syagrus romanzoffiana (Cham.) Glassman (*Cocos romanzoffiana* Cham.; *C. plumosa* Hook; *Arecastrum romanzoffianum* (Cham.) Becc.), QUEEN PALM, is widely cultivated in the region. Occasionally found along creeks or other damp places, it is not truly naturalized but apparently grows from seeds dumped with garden rubbish. It has pinnately divided leaves with the leaf segments in several ranks whereas all the native species in the region have the leaf segments in 2 ranks.

188. ARACEAE

Perennial herbs, sometimes shrubs or climbers, with tubers or rhizomes. Leaves solitary or few, mostly radical, alternate when cauline, sheathing at base. Flowers small or minute, arranged on spadix enclosed in spathe, unisexual or occasionally bisexual, male flowers in upper part of spadix, females flowers below, rarely male and female flowers on

separate plants; perianth absent in unisexual flowers or of 4–6 segments in bisexual flowers; ovary superior. Fruits berries or coriaceous and rupturing.

115 genera with *ca* 2000 species, mostly tropical; 8 genera with 13 species Australia; 6 genera with 6 species south-eastern Queensland.

1. Plants free floating on water surface	.	.	.	.	.	.	.	.	1. <i>Pistia</i>	2
Plants rooted in soil	.	.	.	.	.	.	.	.	.
2. Climbers	.	.	.	.	.	.	.	.	2. <i>Pothos</i>	3
Non-climbers	.	.	.	.	.	.	.	.	.
3. Leaves linear; flowers bisexual	.	.	.	.	.	.	.	.	3. <i>Gymnostachys</i>	4
Leaves not linear; flowers unisexual	.	.	.	.	.	.	.	.	.
4. Leaves 3-lobed to 3-partite (in south-eastern Queensland)	.	.	.	.	.	.	.	.	4. <i>Typhonium</i>	5
Leaves entire	.	.	.	.	.	.	.	.	.
5. Ovules 1 or 2 per loculus, basal; mature leaves not peltate	.	.	.	.	.	.	.	.	5. <i>Alocasia</i>	
Ovules numerous per loculus, parietal; leaves peltate	.	.	.	.	.	.	.	.	6. <i>Colocasia</i>	

1. PISTIA L.

Aquatic plants, free floating on water surface. Leaves numerous in a rosette, arising from short stem. Inflorescences in leaf axils; flowers unisexual; perianth absent; ovaries 1-locular. Fruits berries.

1 species widespread in tropical and subtropical parts of the world, naturalized in Australia, occurring in south-eastern Queensland.

1. **Pistia stratiotes* L.

WATER LETTUCE

Leaf rosettes grey-green, up to 15 cm across; leaves \pm spatulate, *ca* 3–15 cm \times 2–8 cm, nerves conspicuous, often ribbed on undersurface, both surfaces softly hairy. Inflorescences inconspicuous, spathes *ca* 1–2 cm long; flowers minute, unisexual. Fruits ovoid or ellipsoid, up to *ca* 10 mm long.

Widespread in tropical and subtropical parts of the world; apparently introduced to Australia as an ornamental water plant for fish ponds, naturalized in a few places in the region. The species can form dense floating mats obstructing streams and dams. It was first reported as a weed from a dam in the Brisbane suburb of Aspley in 1967. It is a declared noxious weed under the Stock Routes and Rural Lands Protection Acts, 1944–1967.

2. POTHOS L.

Tall climbers; climbing by means of adventitious roots. Leaves alternate, usually distichous. Inflorescences terminal or if axillary then peduncle sheathed at base by 2 or more bracts, spathes concave or flat, at length deciduous or reflexed, spadix cylindrical or globose; flowers bisexual; perianth segments 6. Fruits berries.

About 75 species, tropical and subtropical Asia, Madagascar and Australia; 2 species endemic in Australia; 1 species south-eastern Queensland.

1. *Pothos longipes* Schott

Pothos loureirii auct. non Hook. & Arn., Benth.

Glabrous, climbing up trees to a height of 30 m or more. Leaves variable; petioles phyllodineous, up to 15 cm \times 0.4–2.5 cm; blades narrowly ovate to ovate-acuminate, usually shorter than petiole, up to 10 cm \times 0.6–1.8 cm, or sometimes absent. Inflorescences on peduncles 1–5 cm long, spathes narrow, usually reflexed and shorter than spadix, spadix 3–6 cm long. Berries red, *ca* 1 cm long.

Moreton and Wide Bay districts, in rainforest; moderately common.

3. GYMNOSTACHYS R. Br.

Erect herbs; roots tuberous. Leaves radical, linear, elongated. Spathes minute or absent,

spadices pedunculate in short racemose clusters in axils of leafy bracts along upper part of a tall scape; flowers bisexual; perianth segments 4. Fruits berries.

1 species eastern Australia, occurring in south-eastern Queensland.

1. *Gymnostachys anceps* R. Br.

SETTLER'S FLAX

Gymnostachys gigantea Domin

Leaves up to 1–2 m long, 0.7–3 cm wide, nerves longitudinal, parallel, 2–5 more conspicuous than others. Scares *ca* as tall as leaves, flattened or \pm quadrangular, *ca* 3–5 mm wide, with 2–6 clusters of spadices on upper part of scape, spadices 2–6 together, up to *ca* 12 cm long, sometimes longer, peduncles 1–2 cm long. Berries *ca* 0.8–1.3 cm long.

Throughout the region, in or near rainforest; not common.

4. TYPHONIUM Schott

Leaves radical, petiolate; blades entire or 3–5-lobed. Spathes convolute at base, constricted \pm near middle, spadix with male and female flowers separated by zone of neuter organs, spadix terminated by sterile fleshy appendage. Fruits berries, seeds 1 or 2.

About 25 species from Asia, the Pacific Is and Australia; *ca* 6 species Australia; 1 species south-eastern Queensland.

1. *Typhonium brownii* Schott

Erect, glabrous, 25–50 cm tall. Leaves with petioles up to *ca* 30 cm long; blades divided almost or quite to base into 3 lobes, lateral lobes up to 20 cm long, sometimes dilated at base on lower side, central lobe up to 23 cm long, usually longer than lateral lobes. Inflorescences on scapes shorter than petioles, spathes deep purple inside, 5–15 cm long, spadix with black conical terminal appendage 2–5 cm long. Fruits ovoid.

Moreton and Burnett districts and possibly in other parts of the region, in or near rainforest, often along banks of streams; not common.

5. ALOCASIA (Schott) G. Don

Stems thick, either subterranean or aerial. Leaves large; petioles stout, spongy, sheathing at base; blades undivided, peltate when young, usually hastate-cordate when mature, primary lateral veins conspicuous, with reticulate veins between. Spathes convolute at base, constricted \pm near middle, spadix with male and female flowers separated by zone of neuter organs, spadix terminating in sterile appendage.

About 70 species, mainly tropical Asia but also the Pacific Is and Australia; 1 species Australia, occurring in south-eastern Queensland.

1. *Alocasia macrorrhizos* (L.) G. Don

CUNJEVOI

Arum macrorrhizon L.; *Colocasia macrorrhizos* (L.) Schott

Stems aerial, up to 1 m tall, up to *ca* 15 cm thick. Leaves few at apex of stem; petioles up to *ca* 1 m long; blades hastate-cordate when mature, up to *ca* 100 cm \times 50 cm. Inflorescences on peduncles up to *ca* 1 m long, spathes green, 15–20 cm long, spadix *ca* as long as spathe. Berries bright red, ovoid, 0.8–1.4 cm long.

In or near rainforest; moderately common. Flowers summer. It is cultivated for ornamental purposes. Fatal cases of poisoning have been reported in children who ate flowers, leaves or stems.

6. COLOCASIA Schott

Plants with tuberous rhizomes. Leaves large; petioles stout, spongy; blades undivided, peltate, primary lateral veins conspicuous, with reticulate veins between. Spathes convolute at base, constricted above, spadix with male and female flowers separated by zone of neuter organs, spadix terminating in sterile appendage.

About 8 species, tropical Asia to the Pacific Is; 1 species naturalized Australia, occurring in south-eastern Queensland.

1. **Colocasia esculenta* (L.) Schott

TARO

Arum esculentum L.; *Colocasia antiquorum* Schott

Leaves with petioles up to 1 m long; blades ovate, cordate, peltate, up to *ca* 40 cm × *ca* 30 cm. Spathes yellow, *ca* 15–21 cm long; spadix shorter than spathe. Berries green, ellipsoid, 3–5 mm long.

Native of south-eastern Asia and Polynesia; apparently naturalized in a few places in the region. Flowers summer. Widely cultivated throughout the tropics for its tuberous rhizome which when boiled is edible. Some forms are also cultivated as ornamentals.

Xanthosma violaceum Schott, BLUE TARO, a species similar to *Colocasia esculenta* but with violet margins and lateral veins on the leaf and with the petiole violet and glaucous, may be naturalized along some creeks in the Moreton district.

189. LEMNACEAE

Small to minute, floating or submerged, freshwater aquatic herbs; plants without stems or leaves, consisting of small leaf-like thalli; roots thread-like or roots absent; “daughter” thalli budded from lateral pockets in existing thalli. Flowers minute, emerging from lateral pocket of thallus, unisexual; perianth absent; ovary superior. Fruits minute.

About 4 genera with 35 species, worldwide; 3 genera with 8 species Australia; 3 genera with 5 species south-eastern Queensland.

- | | | | | | |
|---|---|---|---|---------------------|---|
| 1. Thallus ± ellipsoid to subglobose, 0.2–0.5 mm broad | . | . | . | 1. <i>Wolffia</i> | |
| Thallus ± flattened, more than 0.5 mm broad | . | . | . | . | 2 |
| 2. Thallus with small scale-like leaflet covering base of roots | . | . | . | 2. <i>Spirodela</i> | |
| Thallus with tubular sheath surrounding base of roots | . | . | . | 3. <i>Lemna</i> | |

1. *WOLFFIA* Horkel ex Schleiden

Surface-floating herbs; thallus turgid, ellipsoid or globose, majority of thallus below water; roots absent; lateral pocket 1 per thallus. Inflorescences breaking through upper surface of thallus, consisting of 1 male and 1 female flower; male flowers a single stamen; female flowers a flask-shaped ovary with small stigma and style.

About 9 species, tropical and temperate regions of the world; 2 species Australia; 1 species south-eastern Queensland.

1. *Wolffia angusta* Landolt

TINY DUCKWEED

Wolffia globosa auct. Aust. non (Roxb.) Hartog & Plas; *W. arrhiza* auct. Aust. non (L.) Horkel ex Wimmer

Thallus flat on emergent face, with pale central portion and green margin, mostly 0.2–0.5 mm wide, 1.6–3.5 times as long as wide.

Freshwater dams and waterholes throughout the region.

This species is easily overlooked because of its size and may be more widespread than present records would indicate.

2. *SPIRODELA* Schleiden

Surface-floating herbs; thallus flattened; roots 1–18, scale-like leaflet covering base of roots. Inflorescences from lateral pocket of thallus, consisting of 2 male flowers and 1 female flower; male flowers consisting a single stamen; female flowers a single pistil.

4 species, worldwide except Africa; 2 species Australia, occurring in south-eastern Queensland.

- | | | | | | |
|--|---|---|---|-------------------------|--|
| 1. Thallus elliptic to obovate, 2–4 mm long | . | . | . | 1. <i>S. punctata</i> | |
| Thallus ± rounded or broadly obovate, 3–10 mm long | . | . | . | 2. <i>S. polyrrhiza</i> | |

1. *Spirodela punctata* (G. F. W. Meyer) Thompson**THIN DUCKWEED**

Lemna punctata G. F. W. Meyer; *Spirodela oligorrhiza* (Kurz) Hegelm.

Thallus opaque, green, sometimes purplish underneath, elliptic to obovate, 2–4 mm long, rarely longer; roots mostly 2–7 per thallus, up to *ca* 4 cm or more long, perforating the scale-like leaflet.

Still fresh water; moderately common.

2. *Spirodela polyrrhiza* (L.) Schleiden**LARGE DUCKWEED**

Lemna polyrrhiza L.

Thallus flat, opaque, yellow-green, usually purplish underneath, rounded or broadly obovate, 3–10 mm long; roots 1 or 2 per thallus, perforating the scale-like leaflet.

Moreton and Burnett districts; rare in the region.

3. LEMNA L.

Herbs floating on or beneath water surface; thallus \pm flattened; roots 1 or none. Inflorescences from lateral pocket of thallus, consisting of 2 male flowers and 1 female flower; male flowers a single stamen; female flowers a single pistil.

13 species, worldwide; 4 species Australia; 2 species south-eastern Queensland.

1. Thallus floating on water surface, thick and opaque, elliptic to obovate without stalks; root 1

1. *L. aequinoctialis*

Thallus floating beneath water surface, thin and translucent, broadly linear to narrowly ovate, conspicuously stalked; root 1 or none

2. *L. trisulca*

1. *Lemna aequinoctialis* Welwitsch**COMMON DUCKWEED**

Lemna minor auct. Aust. non L.

Thallus opaque, green, elliptic to obovate, *ca* 1–4 mm long; roots solitary, usually 1–4 cm long.

Still fresh water; moderately common in the region.

2. *Lemna trisulca* L.**IVY-LEAF DUCKWEED**

Thallus floating beneath water surface, rising to surface when flowering, thin and transparent, broadly linear to narrowly ovate, with slender stalk at base; roots absent or 1.

Recorded from a few places in the Moreton and Darling Downs districts.

190. PANDANACEAE

Dioecious trees, sometimes scrambling woody vines; trunks and branches often with aerial roots. Leaves usually spirally arranged, crowded towards end of branches, sheathing at the base; blades linear, keeled. Inflorescences axillary, lateral below leaves, or terminal, usually a racemose or branched spadix; flowers sessile, perianth absent; male flowers with numerous stamens, anthers basifixed, 2-locular, rudimentary ovary absent; female flowers with staminodes absent or small, ovary superior, 1-locular, separate or confluent with adjacent ovaries into bundles with separate or united stigmas, style very short or absent. Syncarps oblong to globose with dense crowded mature carpels, these woody, drupaceous or baccate, free or connate into phalanges; seeds minute, with fleshy endosperm and minute embryo.

3 genera with *ca* 1000 species, tropics and subtropics of Old World; 2 genera with *ca* 25 species Australia; 2 genera with 3 species south-eastern Queensland.

1. Stems scrambling or climbing, prop roots absent; female flowers with staminodes; ovary with numerous ovules; fruits berries

1. *Freycinetia*

Stems erect, branched, prop roots present; female flowers without staminodes; ovaries free or connate into clusters, 1–several-locular, each loculus with 1 ovule; fruits drupes

2. *Pandanus*

1. FREYCINETIA Gaudich.

Scrambling or climbing shrubs, with adhesive roots. Leaves with membranous caducous margins at base (auricles). Flowers in terminal or lateral inflorescences consisting of usually 2–5 simple spadices, these congested into an umbel or short raceme at first enclosed by several fleshy green or coloured caducous spathes; male flowers with stamens densely congested on rachis; female flowers with minute staminodes, ovaries densely congested on rachis, stigmas 2 or more, separate or confluent. Fruits baccate; seeds numerous.

150–200 species south-eastern Asia, China, through Malesia to northern Australia and Pacific Is; 4 species Australia; 2 species south-eastern Queensland.

1. Leaves broadly linear to oblong or obovate, acuminate, mostly 10–20
cm \times 1–2.7 cm

1. *F. scandens*

- Leaves linear to linear-ovate, attenuate, up to 50 cm \times 0.6–0.8 cm,
margin often recurved

2. *F. excelsa*

1. Freycinetia scandens Gaudich.

Freycinetia gaudichaudii R. Br. & Bennett; *F. muelleri* Martelli; *F. propinqua* Domin; *F. gonocarpa* S. Moore

Scandent, internodes up to 2 cm long. Leaves scarcely sheathing; auricles up to 3 cm long, caducous; blades coriaceous, broadly linear to oblong or obovate, acuminate, margin often prickly, 10–20 cm \times 1–2(–2.7) cm. Inflorescences terminal; staminate spikes 3 or 4 together, oblong, obtuse, up to ca 1.2 cm long, peduncles ca 2 cm long, bracts white or cream. Syncarps 1–3 together, red when ripe, ovoid-obloid, up to 6 cm \times 2.5 cm; berries obovoid, up to 6–7 mm long, stigmas 2 or 3, rarely 4.

Northern coastal areas of the region, in *Melaleuca* swamps. Flowers summer.

2. Freycinetia excelsa F. Muell.

Small woody climber, internodes less than 1 cm long. Leaves with membranous auricles up to 3 cm long; blades linear-ovate, attenuate from base, sheathing base short, margin often recurved, prickly at base and apex, up to 50 cm \times 0.6–0.8 cm. Inflorescences terminal; staminate spikes 2 or 3, rarely 1, slender, up to 3 cm long, peduncles ca 2 cm long, bracts orange to red. Syncarps 1–3, rarely 4, red when ripe, ovoid-obloid, 3–4 cm \times 2–3 cm; berries clavate, up to ca 7 mm long, stigmas 2–4.

Rainforest. Flowers early summer.

2. PANDANUS Stickman

Trees, usually erect; trunk simple or branched, prop roots often present. Leaves spirally arranged, crowded towards end of stems. Flowers in large head or spadices enclosed in spathes; male spadices racemose or branched with secondary pale spathes, stamens numerous, inserted either directly on rachis or on short racemiform or umbelliform stemonophores; female spadices 1 or more and then in spikes, globose, ellipsoid or cylindrical, ovaries densely crowded, 1-carpellate, sometimes fused to adjacent ovaries, stigma sessile. Syncarps often large, breaking into usually numerous phalanges, pericarp often fibrous, exocarp fleshy, mesocarp sometimes with air cavities, endocarp usually woody or bony, locules 1 or more; seed solitary, erect.

About 600 species, palaeotropical; ca 30 species Australia; 1 species south-eastern Queensland.

1. Pandanus tectorius Parkinson ex Z

SCREW PINE

Pandanus pedunculatus R. Br.; *P. tectorius* var. *australianus* Martelli; *P. somersetensis* H. St. John; *P. blakei* H. St. John; *P. viridinsularis* H. St. John; *P. yorkensis* H. St. John; *P. pedunculatus* var. *yorkensis* (H. St. John) Stone; *P. adscendens* H. St. John; *P. brownii* H. St. John; *P. bowenensis* H. St. John; *P. cordatus* H. St. John; *P. extralittoralis* H. St. John; *P. heronensis* H. St. John; *P. tectorius* var. *heronensis* (H. St. John) Stone; *P. hubbardii* H. St. John; *P. humifer* H. St. John; *P. stradbroomensis* H. St. John; *P. tectorius* var. *stradbroomensis* (H. St. John) Stone; *P. terrireginae* H. St. John; *P. tectorius* var. *incrassatus* Stone; *P. odoratissimus* auct. non L. f.

Branched tree up to 12 m high with prop roots. Leaves M-shaped in section in the

middle, prickles on margin and midrib beneath, 0.8–1.6 m \times 0.05–0.1 m near base. Male inflorescences terminal, pedunculate, often more than 40 cm long, with chartaceous white bracts subtending numerous lateral spikes, each spike 4–7.5 cm long, stamens in fascicles of ca 10–35. Syncarps terminal, solitary, globose to ellipsoid, 12–18 cm \times 10–13 cm, phalanges orange-red, pyriform, 50–100 per syncarp, 4.5–7 cm \times 2.5–6 cm \times 2.5–5 cm thick, 4–8-angled, 5–20 carpels per phalange.

Along sea coast, both on beaches and on rocky headlands.

191. SPARGANIACEAE

Freshwater aquatic herbs, rhizomatous; stems simple or branched, leafy. Leaves elongated, stiff or flaccid, erect or floating, sheathing at base. Flowers unisexual, crowded in separate globose clusters, male clusters above female clusters in each inflorescence; perianth of 3–6 membranous scales; male flowers with 3 or more stamens; female flowers with superior sessile ovary. Fruits often beaked, indehiscent.

1 genus with 20 species, Northern Hemisphere, Australia and New Zealand; 2 species Australia, both occurring in south-eastern Queensland.

1. SPARGANIUM L.

Characters as for family.

- | | |
|--|--------------------------|
| 1. Basal leaves 0.2–0.6 cm wide; stems up to ca 0.75 m tall; inflorescences unbranched or with solitary branch at base | 1. <i>S. subglobosum</i> |
| Basal leaves 0.8–2 cm wide; stems up to ca 2 m tall; inflorescences with several branches | 2. <i>S. erectum</i> |

1. *Sparganium subglobosum* Morong

FLOATING BUR-REED

Sparganium antipodum Graebner; *S. angustifolium* auct. non Michaux, R. Br.

Stems unbranched or with 1 short branch, up to ca 75 cm tall, occasionally taller. Leaves \pm erect, often spongy, linear, flat to semicylindrical in cross-section, acute to obtuse, reducing in size upwards along stem, basal leaves up to ca 100 cm \times 0.2–0.6 cm. Inflorescences unbranched or with single branch at base. Fruiting heads mostly 1–1.5 cm diameter excluding beaks.

Moreton district, usually along the edges of creeks and streams; not common. Flowers spring to autumn.

2. *Sparganium erectum* L.

ERECT BUR-REED; BRANCHING BUR-REED

Stems branched with up to 5 branches, up to ca 2 m tall. Leaves erect, often spongy, linear, triangular in cross-section (in specimens seen), acute to obtuse, up to ca 160 cm \times 0.8–2 cm. Inflorescences with several branches. Fruiting heads mostly 1.5–2 cm diameter excluding beaks.

Moreton district; rare.

192. TYPHACEAE

Robust perennial marsh or freshwater aquatic herbs, rhizomatous; stems simple, rigid. Leaves sheathing at base, in two rows along stems, \pm erect, elongated, linear, rather thick and spongy. Flowers numerous, densely crowded in terminal woody spikes, male and female flowers in separate remote portions of spikes, male portion above, female below; perianth of slender threads or of elongated spatulate scales; stamens 2–5; ovary superior, stipitate.

1 genus with ca 10 species, temperate and tropical regions of the world; 3 species Australia; 2 species south-eastern Queensland.

1. TYPHA L.

Characters as for the family.

1. Floral bracts of female flowers numerous, broadly spatulate; stigmas linear

Floral bracts of female flowers few, narrowly spatulate; stigmas narrowly ovate or narrowly obovate
1. *T. domingensis*

2. *T. orientalis*

1. ***Typha domingensis* Pers.**

CUMBUNGI; BULRUSH

Typha angustifolia auct. Aust. non L.; *T. brownii* Kunth; *T. angustifolia* var. *brownii* (Kunth) Kronf.

Stems up to *ca* 3 m tall. Leaf sheaths not auriculate, or uppermost 1 or 2 sheaths auriculate; blades up to 1 m long or longer, up to 3 cm wide. Male and female spikes up to 5.5 cm apart; female spikes 0.5–2 cm diameter, floral bracts numerous, broadly spatulate, stigmas linear.

Throughout region, in or alongside creeks, ponds, etc.

2. ***Typha orientalis* C. Presl**

CUMBUNGI; BULRUSH

Typha muelleri Rohrb.

Stems up to *ca* 3 m tall. Leaf sheaths of 2–4 uppermost leaves auriculate; blades up to 1 m long or longer, up to 3 cm wide. Male and female spikes touching or up to 2 cm or more apart; female spikes 1–3 cm diameter, floral bracts few, narrowly spatulate, stigmas narrowly obovate.

Throughout region, in or alongside creeks, ponds, etc.

The two species cannot be distinguished in the field with any certainty. Both species form dense clumps in ditches, streams, swamps, etc. in water up to *ca* 1.5 m deep and can be a nuisance by obstructing water flow or preventing access to water.

193. CYPERACEAE

Annual or perennial herbs, often rhizomatous; stems mostly simple. Leaves mostly basal; leaf sheaths closed; ligules rarely present. Inflorescences subtended by 1–several leaf-like bracts; flowers small, bisexual or unisexual, arranged in spikelets, spikelets arranged in umbels, panicles, spikes or clusters, each flower usually solitary within a glume, glumes distichously or spirally arranged; perianth reduced to scales, bristles or hairs, often absent; stamens usually 1–3, rarely 4–6, anthers 2-locular; ovary superior, 1-locular, ovule 1, style 2- or 3-branched or 2- or 3-toothed. Fruits nuts.

About 90 genera with 4 000 species, worldwide, mostly in damp places; *ca* 47 genera with *ca* 650 species Australia; 26 genera with 243 species south-eastern Queensland.

1. Flowers bisexual; with or without hypogynous scales or bristles

Flowers strictly unisexual; without hypogynous scales or bristles
- 2

32
2. Hypogynous scales or bristles absent

Hypogynous scales or bristles present
- 3

18
3. Spikelets distichously or subdistichously arranged

Spikelets spirally arranged
- 4

8
4. Rachillas contorted, internodes not all equally spaced

Rachillas straight, internodes equally spaced
23. *Schoenus*

5
5. Spikelets 2-, rarely 3-flowered, usually producing 1 nut; style base thickened and persistent on nut

Spikelets more than 2-flowered; style base thickened or not but not persistent on nut
- 6

7

- | | | |
|---|--------------------------|----|
| 6. Style base nearly as long as nut; usually only nut of uppermost flower maturing; stems mostly up to 0.5 mm thick | 20. <i>Tetraria</i> | 9 |
| Style base less than $\frac{1}{2}$ as long as nut; usually only nut of lowermost flower maturing; stems more than 0.5 mm thick | 17. <i>Baumea</i> | |
| 7. Style dilated at base, frequently fimbriate | 11. <i>Fimbristylis</i> | |
| Style not dilated at base, not fimbriate | 14. <i>Cyperus</i> | |
| 8. Spikelets with 1 or 2 bisexual flowers, others male or sterile | | 9 |
| Spikelets with more than 2 bisexual flowers | | 12 |
| 9. Leaves reduced to sheathing scales (occasionally young plants of <i>Caustis recurvata</i> have very short blades) | 21. <i>Caustis</i> | |
| Leaves with blades | | 10 |
| 10. Stigmas 2 | 13. <i>Trachystylis</i> | |
| Stigmas 3 | | 11 |
| 11. Tubular bracteoles present at base of spikelets; nuts seated on a saucer-shaped disk; upper flower abortive or male; anther filaments not elongating after anthesis | 15. <i>Cladium</i> | |
| Tubular bracteoles absent; nuts not seated on a saucer-shaped disk; lower flower abortive or male; anther filaments frequently elongating after anthesis | 22. <i>Gahnia</i> | |
| 12. Style bases enlarged and adnate to nuts | | 13 |
| Style bases not enlarged and not adnate to nuts | | 14 |
| 13. Inflorescences single terminal spikelets, not subtended by involucre bracts; leaves reduced to sheathing bracts | 10. <i>Eleocharis</i> | |
| Inflorescences panicles, subtended by involucre bracts; leaves with long blades | 12. <i>Bulbostylis</i> | |
| 14. Nuts oblong-linear, slightly curved, up to 1 mm \times 0.2 mm, apiculate, without gynophore | 5. <i>Lipocarpha</i> | |
| Nuts not as above | | 15 |
| 15. Glumes aristate; plants densely hairy, dark green or dark grey | 4. <i>Fuirena</i> | |
| Glumes not aristate; plants sparsely hairy, green | | 16 |
| 16. Styles dilated at base, usually fimbriate | 11. <i>Fimbristylis</i> | |
| Styles not dilated at base, not fimbriate | | 17 |
| 17. Nuts transversely wavy ridged | 8. <i>Schoenoplectus</i> | |
| Nuts smooth or not transversely wavy ridged | 9. <i>Isolepis</i> | |
| 18. Spikelets usually with 1 or 2 fertile flowers, rarely more | | 19 |
| Spikelets with numerous fertile flowers | | 25 |
| 19. Glumes distichously or subdistichously arranged | | 20 |
| Glumes spirally arranged | | 22 |
| 20. Glumes very distinctly distichous; fertile portion of rachilla zig-zag-shaped; style base not thickened not persistent | 23. <i>Schoenus</i> | |
| Glumes subdistichous; rachilla straight; style base thickened and persistent | | 21 |
| 21. Inflorescences solitary, with compact heads of spikelets enclosed by dark sheathing bases of 2 subtending bracts; stigmas 3 | 18. <i>Ptilanthelium</i> | |
| Inflorescences paniculate, narrow, with several distant fascicles of branches of unequal length; stigmas 2 | 19. <i>Cyathochaeta</i> | |
| 22. Stigmas 2 | | 23 |
| Stigmas 3 | | 24 |

- | | | |
|--|--|----------|
| 23. Glumes 5–8; nuts globular to obovoid; hypogynous bristles antrorsely scabrous, sometimes slightly plumose at base
Glumes 4; nuts linear-oblong in outline; hypogynous bristles white, antrorsely scabrous above, plumose towards base | 24. <i>Rhynchospora</i>
19. <i>Cyathochaeta</i> | |
| 24. Nuts distinctly exserted; scales 4, inner 2 flat, outer 2 keeled and ciliate
Nuts as long as subtending glume; scales mostly 6, biseriate, inner and outer similar | 1. <i>Exocarya</i>
16. <i>Lepidosperma</i> | |
| 25. Stems septate; hypogynous scales more than 6, outer 2 keeled
Stems not septate; scales or bristles 6 or less, all similar | | 26
27 |
| 26. Glumes closely imbricate; hypogynous scales not exserted from glumes; nuts smooth
Glumes rather loose; scales exserted from glumes; nuts with 8–12 longitudinal ribs | 2. <i>Lepironia</i>
3. <i>Chorizandra</i> | |
| 27. Spikelets solitary, not subtended by an involucre bract
Spikelets several, subtended by bracts | 10. <i>Eleocharis</i> | 28 |
| 28. Hypogynous scales absent, hypogynous bristles usually 4–6
Hypogynous scales 3 or less, sometimes alternating with 3 hypogynous bristles | | 29
31 |
| 29. Cauline leaves absent
Cauline leaves present | 8. <i>Schenoplectus</i> | 30 |
| 30. Spikelets numerous, less than 1 cm long; inflorescences compound umbels; glumes <i>ca</i> 2 mm long
Spikelets few, 1–4 cm long; inflorescences simple umbels or heads; glumes 4–10 mm long | 6. <i>Scirpus</i>
7. <i>Bolboschoenus</i> | |
| 31. Hypogynous scales 2, enveloping nut, hypogynous bristles absent
Hypogynous scales 3, alternating with 3 outer short hypogynous bristles | 5. <i>Lipocarpha</i>
4. <i>Fuirena</i> | |
| 32. Monoecious plants; female flower enclosed by utricle; flowers in unisexual or bisexual spikelets
Monoecious or dioecious plants; female flower not enclosed by utricle; flowers in unisexual spikelets | 26. <i>Carex</i>
25. <i>Scleria</i> | |

1. *EXOCARYA* Benth.

Perennial rhizomatous herbs; stems leafy. Inflorescences umbellate, compound, \pm erect, on long filiform rays with central sessile spikelet; spikelets small, 1, rarely 2 bisexual with 2 or 3 male flowers below, few producing nuts; glumes 10–12, imbricate all around rachilla; hypogynous scales 4; stamens 3; stigmas 2, style dilated at base. Nuts exserted, crowned by persistent blackish base of style.

A monotypic genus restricted to eastern Queensland and New South Wales.

1. *Exocarya scleroides* Benth.

Rhizomes creeping; stems erect, rather weak, trigonous, margin slightly scabrous, 0.6–1.2 m tall, 2–3 mm thick. Leaves cauline, long, flat, margin scabrous, up to 5 mm wide, basal leaves reduced to sheathing scales or blade very short. Inflorescences up to 25 cm long, consisting of unequal primary rays each up to 20 cm long, secondary rays much shorter; involucre bracts 3 or 4, leaf-like, lowest *ca* as long as inflorescence; spikelets solitary, dark brown, narrowly oblong, 3–3.5 mm long; lower glumes obtuse, short, upper glumes longer; hypogynous scales 4, inner 2 flat or concave, outer 2 folded with ciliate keels. Nuts erect, obloid to nearly globular, obtuse, *ca* 4 mm \times *ca* 2.5 mm. **Fig. 41D.**

Moreton and Wide Bay districts, in rainforests and closed forests on the ranges.

2. LEPIRONIA Rich.

Perennial rhizomatous herbs; stems erect, terete, transversely septate. Leaves reduced to basal sheathing scales. Inflorescences consisting of single pseudolateral spikelet, involucre bract 1, similar to and continuous with stem; spikelet terete with many bisexual flowers; glumes chartaceous, closely imbricate around persistent rachis; hypogynous scales numerous, outer 2 keeled, keel ciliate, inner flat, linear-ovate, acute; stamens 8–10, alternating with inner scales or opposite outer scales, anthers linear, shortly apiculate; style slightly thickened at base, base persistent on nut as short beak; stigmas 2. Nuts flat or plano-convex, acutely keeled on margins.

Monotypic genus extending from Madagascar to south-eastern Asia and Australia, occurring in south-eastern Queensland.

1. *Lepironia articulata* (Retz.) Domin

Restio articulatus Retz.; *Lepironia mucronata* Rich.

Rhizome creeping; stems clustered, rigid, terete, smooth, 0.6–2.3 m tall, 2–8 mm thick. Spikelet obliquely erect, ovoid to obloid-ellipsoid to fusiform, acute, 1–4 cm × 0.6–1 cm; glumes numerous, shining brown to nearly black, broadly obovate, obtuse, 4–6 mm long; anthers with dark appendage 0.5 mm long. Nuts brown, broadly ovate in outline, longitudinally striate, smooth, apiculate. **Fig. 41A.**

Widespread in eastern Moreton and Wide Bay districts, also known from north-western Darling Downs district.

3. CHORIZANDRA R. Br.

Perennial rhizomatous herbs; stems erect, terete, smooth, septate. Leaves basal, terete and septate or reduced to sheathing scales. Inflorescences pseudolateral, solitary, consisting of numerous spikelets, involucre bract 1, similar to and continuous with stem; glumes loosely imbricate all round rachis, some of lowest ones empty; hypogynous scales numerous, lateral outer 2 keeled, others narrow, flat and closely packed in several rows; stamens 6–12 or more; style deeply divided, stigmas 2 or 3. Nuts obovoid-globular with 8–12 prominent longitudinal ribs.

4 species all endemic in Australia; 2 species south-eastern Queensland.

All species are known as **BRISTLE RUSHES**

- | | |
|---|-----------------------------|
| 1. Bases of involucre bracts dilated and partially enclosing inflorescences;
glumes broad and obtuse | 1. <i>C. cymbaria</i> |
| Bases of involucre bracts hardly dilated and not enclosing
inflorescences; glumes acute-acuminate | 2. <i>C. sphaerocephala</i> |

1. *Chorizandra cymbaria* R. Br.

Rhizomes creeping; stems 0.6–1.3 m tall, 2–4 mm thick. Leaves similar and often longer than stem or reduced to sheathing bracts. Inflorescences ovoid-globular, partly enclosed by dilated base of involucre bract; glumes membranous, broad, obtuse; hypogynous scales dark, oblong-spathulate, denticulate, as long as or longer than glumes; stigmas mostly 3. **Fig. 41C.**

Eastern Moreton and Wide Bay districts and also known from near Wallangarra in southern Darling Downs district, in swampy areas.

2. *Chorizandra sphaerocephala* R. Br.

Rhizomes short; stems 0.45–1.5 m tall, 4–7 mm thick. Leaves similar to stems but shorter. Inflorescences very dark brown to black, globose, sessile, involucre bract similar to and continuous with stem, not enlarged at base nor sheathing inflorescence; glumes numerous, acute-acuminate, aristate with fine point; hypogynous scales nearly as long as glumes, lateral outer 2 keeled, inner ones spathulate, dark at apex, somewhat aristate, margin and apex ciliate; stigmas 2. **Fig. 41B.**

Moreton and Wide Bay districts, in swampy areas.

4. FUIRENA Rottb.

Perennial or annual herbs; stems erect, noded. Leaves linear or narrowly ovate. Inflorescences paniculate, consisting of terminal partial inflorescence and axillary partial inflorescences; spikelets greyish green, clustered, terete, flowers bisexual; glumes spirally imbricate, not keeled, aristate, 3-nerved, hairy on back; usually 3 outer hypogynous bristles opposite angles of triquetrous nut and 3 inner hypogynous scales opposite faces of nut, sometimes bristles and/or scales absent; stamens 1–3; styles not or hardly dilated at base, glabrous, stigmas 3. Nuts small, obovoid or ovoid, stipitate, smooth, falling off with scales and bristles.

About 40 species, tropical and subtropical parts of the world, especially Africa; 5 species Australia; 4 species south-eastern Queensland.

- | | | |
|---|-------------------------|---|
| 1. Hypogynous scales absent | 1. <i>F. nudiflora</i> | |
| Hypogynous scales present | | 2 |
| 2. Blades of the inner hypogynous scales strongly thickened at apex, with awn <i>ca</i> 1 mm long | 2. <i>F. incrassata</i> | |
| Blades of the inner hypogynous scales not strongly thickened, not awned | | 3 |
| 3. Annuals; inner hypogynous scales stipitate, cordate at base, with distinct central claw; outer hypogynous bristles 3 | 3. <i>F. ciliaris</i> | |
| Perennials; inner hypogynous scales sessile, narrowed at base, scarcely clawed; outer hypogynous bristles absent | 4. <i>F. umbellata</i> | |

1. *Fuirena nudiflora* S. T. Blake

Annual; stems soft, striate, sulcate, up to 20 cm tall, pubescent except at base. Leaves linear, pilose, 3–7-nerved. Spikelets dense, ovoid-oblong; glumes oblong-ovate, obtuse, up to 2 mm long including 1 mm long awn; hypogynous bristles and scales absent; stamen 1. Nuts white, *ca* 0.45 mm × *ca* 0.3 mm.

Recorded from the Moreton and Burnett districts; rare.

2. *Fuirena incrassata* S. T. Blake

Annual; stems obtuse-angular, striate, sulcate, up to 45 cm tall, pubescent towards top. Leaves linear-ovate, margin ciliate, 3–5-nerved. Spikelets dense, ovoid to oblong-ovoid; glumes obovate to oblong-obovate, *ca* 3.2 mm × *ca* 1.3 mm including 1 mm long awn, hairy; hypogynous bristles $\frac{1}{2}$ length of nut, hypogynous scales stipitate, cordate at base, strongly thickened at apex with 3 nerves, central one running out to 1 mm long point, scales longer than nut; stamens 3. Nuts brown, 0.75–0.8 mm × *ca* 0.65 mm. **Fig. 42B.**

Widespread in the Burnett, Darling Downs and Moreton districts, in damp situations; not common.

3. *Fuirena ciliaris* (L.) Roxb.

Scirpus ciliaris L.; *Fuirena glomerata* Lam.

Annual; stems obtuse-angular, striate, up to 40 cm tall, pubescent at least towards top. Leaves linear-ovate, margin ciliate, 3–5-nerved. Spikelets dense, ovoid to obloid-ovoid; glumes obovate to oblong-obovate, hairy, 2.5–2.8 mm × *ca* 1.2 mm including 1 mm long awn, hairy; hypogynous bristles up to as long as nut, hypogynous scales cordate to hastate at base, distinctly stipitate, truncate at apex with 3 nerves running out into points, not exceeding length of nut; stamens 3. Nuts brown, 0.75–0.8 mm × *ca* 0.65 mm. **Fig. 42A.**

Widespread in eastern Moreton and Wide Bay districts, also recorded from Burnett district.

4. *Fuirena umbellata* Rottb.

Rhizomatous perennial; stems acutely 4- or 5-angular, 0.3–1.1 m tall. Leaves flat, ciliate on margin, nerves 5, prominent. Spikelets dense, ovoid to obloid-ovoid; glumes *ca* 3.5 mm × *ca* 1.5 mm including recurved awn; hypogynous bristles usually absent, hypogynous scales subsessile, narrowed at base, 3-nerved, central one slightly running out, as long as nut; stamens 3. Nuts yellow to brown, 1–1.25 mm × 0.6–0.7 mm. **Fig. 42C.**

Widespread in Moreton and Wide Bay districts, in swampy coastal areas.

5. LIPOCARPHA R. Br.

Annual or perennial herbs; stems tufted, erect. Leaves linear or filiform. Inflorescences terminal clusters or heads of 1–8 spikelets, involucre bracts 2–4, leaf-like; spikelets small, sessile, terete, with numerous bisexual flowers; glumes imbricate all round persistent rachis, not keeled; perianth consisting of 2 hyaline nerved hypogynous scales parallel to glume, as long as or longer than enclosed nut; stamens 1 or 2, anthers small, oblong to linear with shortly produced connectives; style glabrous, deciduous, not dilated at base, stigmas 2 or 3. Nuts dorsiventrally compressed, trigonous or plano-convex, smooth, reticulate, enclosed by hypogynous scales.

About 15 species, America, Africa, Asia and Australia; 2 species Australia both occurring in south-eastern Queensland.

- | | |
|--|---------------------------|
| 1. Annuals; glumes with recurved mucros; spikelets greenish brown, 2–3 mm wide; hypogynous scales slightly longer than enclosed nuts . | 1. <i>L. microcephala</i> |
| Perennials; glumes with an erect or incurved tip; spikelets whitish, 4–5 mm wide; hypogynous scales markedly longer than enclosed nuts . | 2. <i>L. chinensis</i> |

1. *Lipocarpa microcephala* (R. Br.) Kunth

Hypaelyptum microcephalum R. Br.; *Scirpus squarrosus* L. var. *dietrichiae* (Boeck.) Benth.

Annual; stems slender or filiform, usually 5–20 cm tall, 0.5–1 mm thick. Leaves weak, flat, shorter than stems, 1–2 mm wide. Inflorescences consisting of 1–5 spikelets, involucre bracts 2 or 3, at first overtopping inflorescences, finally horizontal to reflexed; spikelets greenish brown, ovoid to obloid-ovoid, obtuse, 3–5 mm × 2–3 mm; glumes membranous, oblong-obovate, strong midnerve produced into recurved mucro, ca 1.2 mm long; hypogynous scales linear, slightly longer than enclosed nut, 3–5-nerved; stamens 1 or 2, anthers oblong; stigmas 2. Nuts stramineous to dusky, oblong-linear in outline, slightly curved. **Fig. 410; 42D.**

Widespread in the region; not common.

2. *Lipocarpa chinensis* (Osbeck) Kern

Scirpus chinensis Osbeck; *Lipocarpa argentea* R. Br.

Perennial, rhizomatous; stems 20–40 cm tall, 1–2 mm thick. Leaves flat, usually shorter than stems, 2–4 mm wide. Inflorescences consisting of 3–6 spikelets in dense terminal head, involucre bracts 2–4, at first overtopping inflorescence, finally horizontal to reflexed; spikelets whitish, ovoid, obtuse, 5–8 mm × 4–5 mm; glumes membranous, spatulate to oblong-obovate with obtuse triangular tip, central nerve produced into short point, 1.75–2.75 mm long; hypogynous scales oblong, markedly longer than enclosed nut, 5–7-nerved; stamens 1, anther linear; stigmas 3. Nuts stramineous to dusky, oblong in outline, usually slightly curved. **Fig. 42E.**

Eastern Moreton district; rare.

6. SCIRPUS L.

Perennial terrestrial herbs; stems tufted, erect, triquetrous, noded. Leaves well developed. Inflorescences terminal, umbellate, subtended by leafy bracts; spikelets clustered, terete, many-flowered; glumes persistent all round persistent rachis; flowers bisexual, hypogynous bristles 6, filiform; stamens 2; stigmas 3. Nuts trigonous.

About 20 species worldwide; 1 species Australia, occurring in south-eastern Queensland.

1. *Scirpus polystachyus* F. Muell.

Stems 0.6–1.8 m tall, 4–10 mm thick. Leaves well developed along stem, broad, flat, uppermost as long as stem. Inflorescences large loose compound umbels with numerous slender scabrous rays, involucre bracts 3 or 4, leaf-like, some overtopping inflorescence; spikelets dark brown, clustered on rays or pedicellate, terete, obloid-ovoid, ± acute, 5–9 mm × ca 2 mm; glumes oblong-ovate, membranous, obtuse, ca 2 mm long; hypogynous

bristles flexuose and up to twice as long as nut. Nuts yellowish, ovate in outline, trigonous, apiculate.

Known from creek banks, etc., in the Stanthorpe-Wallangarra area of south-eastern Darling Downs district.

7. **BOLBOSCHOENUS** (Aschers.) Palla

Perennial herbs, rhizomes sometimes forming tubers; stems erect, close together or solitary, erect, triquetrous, noded. Leaves well developed. Inflorescences terminal, subtended by leafy involucre bracts; spikelets solitary or clustered, terete, many-flowered, flowers bisexual; glumes spirally arranged around persistent rachis; hypogynous bristles 4–6; stamens 3; styles slender, not thickened towards base, stigmas 2 or 3. Nuts obovoid, lenticular or trigonous, apiculate, smooth.

About 16 species, worldwide; 3 species Australia; 2 species south-eastern Queensland.

- | | |
|---|--------------------------|
| 1. Nuts flattened on both sides; stigmas mostly 2; plants usually 0.45–1 m tall | 1. <i>B. caldwellii</i> |
| Nuts trigonous; stigmas 3; plants 1–2 m tall | 2. <i>B. fluviatilis</i> |

1. **Bolboschoenus caldwellii** (V. J. Cook) Sojak

Scirpus caldwellii V. J. Cook; *Scirpus maritimus* auct. non L.

Perennial with creeping rhizomes often forming ovoid tubers; stems up to 1 m tall, 2–7 mm thick. Leaves cauline, long, flat, often overtopping inflorescence. Inflorescences variable, usually umbellate and consisting of several unequal rays or contracted into sessile cluster or ray solitary, bracts 2 or 3, very long, leaf-like; spikelets solitary or in clusters of 3–6, ovoid, ± acute, 5–10 mm long, glumes pubescent, midrib extended into recurved mucro *ca* 2 mm long; stigmas 2, occasionally 3. Nuts brown to blackish, obovoid, flattened on both sides, 3–3.5 mm × *ca* 2 mm.

Moreton district, in damp situations, swamps, etc.

2. **Bolboschoenus fluviatilis** (Torrey) Sojak

Scirpus maritimus L. var. *fluviatilis* Torrey; *S. fluviatilis* (Torrey) A. Gray

Perennial with creeping rhizomes often forming ovoid tubers; stems 1–2 m tall, 2–7 mm thick. Leaves cauline, long, flat, often overtopping inflorescence. Inflorescences variable, usually umbellate and consisting of several unequal rays or contracted into sessile cluster or solitary, bracts 2 or 3, very long, leaf-like; spikelets solitary or in clusters of 3–6, ovoid, ± acute, up to 2 cm × 0.5–0.6 cm, glumes pubescent, midrib extended into recurved mucro 3–4 mm long; stigmas mostly 3. Nuts brown to blackish, obovoid, flattened on both sides, 3–4 mm × 1.75–2 mm. **Fig. 41M.**

Known from damp situations throughout the region.

8. **SCHOENOPLECTUS** Palla

Annual or perennial, terrestrial, rhizomatous or tufted herbs; stems erect to procumbent, terete to triquetrous. Leaves with blades or reduced to bladeless sheaths. Inflorescences terminal or pseudolateral, subtended by involucre bracts continuous with stem; spikelets solitary or clustered, terete or angular, few-many-flowered, flowers bisexual, except where basal female spikelets occur; glumes imbricate all around persistent rachis; hypogynous bristles 0–6; stamens 2–3; style slender, not thickened towards base; stigmas 2 or 3. Nuts plano-convex or biconvex, obovoid, apiculate, smooth or rugulose.

About 60 species, worldwide; 11 species Australia; 6 species south-eastern Queensland.

- | | |
|--|---------------------------|
| 1. Small annuals or perennials, usually not more than 35 cm tall; stems up to 1 mm thick | 2 |
| Stout perennials, usually more than 35 cm tall; stems more than 1 mm thick | 4 |
| 2. Stigmas 3; hypogynous bristles absent | 1. <i>S. lateriflorus</i> |
| Stigmas 2; hypogynous bristles absent or 6 | 3 |

- | | |
|---|----------------------------|
| 3. Hypogynous bristles 6; glumes 2-3 mm long, yellowish green, margin not ciliate | 2. <i>S. dissachanthus</i> |
| Hypogynous bristles absent; glumes 3-3.5 mm long, patchy red tinged, margin minutely ciliate | 3. <i>S. erectus</i> |
| 4. Stems markedly triquetrous with concave sides; inflorescences capitate; involucre bracts triquetrous, overtopping inflorescences | 4. <i>S. mucronatus</i> |
| Stems terete; inflorescences usually compound; involucre bracts terete, shorter than or barely overtopping inflorescences | 5 |
| 5. Hypogynous bristles plumose with antrorse hairs; involucre bracts slightly longer than inflorescences | 5. <i>S. litoralis</i> |
| Hypogynous bristles with scabrous retrorse barbs; involucre bracts shorter than inflorescences | 6. <i>S. validus</i> |

1. *Schoenoplectus lateriflorus* (Gmelin) Lye

Scirpus lateriflorus Gmelin

Annual; stems tufted, erect, 8-35 cm tall, 0.5-1 mm thick. Leaves reduced to sheaths with short setaceous tips. Inflorescences pseudolateral, involucre bracts 1 or 2, lower bract similar to and continuous with stem; spikelets 2-15, angular, obloid-ovoid, acute, 5-8(-10) mm × 1.5-2.5 mm, many-flowered; glumes frequently reddish tinged, membranous, ovate, mucronulate, margin hyaline, 2-3 mm long; hypogynous bristles absent; stamens 3, connectives of anthers white papillose; stigmas 3, frequently a solitary, female flower with long exserted style is present in axil of basal leaf sheath. Nuts trigonous, obovate, apiculate, conspicuously many-ridged.

North-western Darling Downs district, in damp situations; rare.

2. *Schoenoplectus dissachanthus* (S. T. Blake) Raynal

Scirpus dissachanthus S. T. Blake

Annual; stems tufted, erect, 8-25(-30) cm tall, 0.8-1 mm thick. Leaves mostly reduced to sheaths or with short pointed blades. Inflorescences pseudolateral, involucre bract 1, ½ to nearly as long as stem, similar to and continuous with stem; spikelets 1-4, obloid-cylindrical, obtuse, 0.7-1(-1.2) cm × 0.2-0.3 cm, many-flowered; glumes yellowish green, appressed, ovate, acute, glabrous, membranous with broad hyaline margin, 2-3 mm long; hypogynous bristles 6, ¼ to as long as nut; stamens 2; styles 2, frequently a solitary female flower with long exserted style is present in axil of basal leaf sheath. Nuts light to dark brown, ± biconvex, suborbicular, apiculate, conspicuously transversely many-ridged.

North-western Darling Downs district, in damp situations; rare.

3. **Schoenoplectus erectus* (Poiret) Palla ex Raynal

Scirpus erectus Poiret

Perennial. Stems tufted, erect to ascending, 6-35 cm tall, ca 1 mm thick. Leaves mostly reduced to sheaths with short point. Inflorescences pseudolateral, involucre bract 1, similar to and continuous with stem; spikelets 2-6, angular, obloid-ovoid, ± acute, 0.5-1.2 cm × 0.15-0.2 cm, many-flowered; glumes red variegated, membranous, ovate, mucronulate, margin hyaline, minutely ciliate, 3-3.2 mm long; hypogynous bristles absent; stamens 3, connectives of anthers white papillose; stigmas 2, occasionally 3, frequently a solitary female flower with long exserted style is present in axil of basal leaf sheath. Nuts black, plano-convex to biconvex, ovate, apiculate, conspicuously transversely wavy-ridged. **Fig. 411.**

Native of Africa, Asia and North and South America; apparently introduced to Australia, found in the region only on Moreton I. in Moreton district.

4. *Schoenoplectus mucronatus* (L.) Palla ex Kerner

Scirpus mucronatus L.

Perennial; stems stout, erect, tufted, triquetrous with concave sides, 35-100 cm tall, 3-8 mm thick. Leaves reduced to sheaths. Inflorescences pseudolateral, capitate, with few-many spikelets, involucre bract 1, similar to and continuous with stem; spikelets sessile, terete, obloid-ovoid, ± acute, 0.8-2 cm × 0.4-0.6 cm, many-flowered; glumes



Fig. 41 CYPERACEAE — A₁–A₄ *Lepironia articulata*, A₁ spike x 1, A₂ glume x 2, A₃ flower x 6, A₄ hypogynous scale x 6; B–C *Chorizandra* spp. — B *C. sphaerocephala*, inflorescence x 1; C *C. cymbaria*, inflorescence x 1; D₁–D₂ *Exocarya scleroides*, D₁ inflorescence x 1; D₂ nut x 6; E₁–E₂ *Isolepis hookeriana*, E₁ inflorescence x 6, E₂ nut x 25; F *Schoenoplectus litoralis*, nut with hypogynous bristles x 6; G *Isolepis inundata*, inflorescence x 1; H₁–H₃ *Schoenoplectus validus*, H₁ inflorescence x 1, H₂ glume x 6, H₃ nut with hypogynous bristles x 6; I₁–I₃ *Schoenoplectus erectus*, I₁ part of plant x 1, I₂ nut x 8, I₃ T.S. of nut x 8; J₁–J₂ *Bolboschoenus caldwellii*, J₁ nut x 6, J₂ T.S. of nut x 6; K₁–K₂ *Isolepis nodosa*, K₁ inflorescence x 1, K₂ nut x 8; L₁–L₂ *Isolepis cernua*, L₁ nut x 12, L₂ T.S. of nut x 12; M₁–M₃ *Bolboschoenus fluviatilis*, M₁ inflorescence x 1, M₂ glume x 2, M₃ nut with hypogynous bristles x 6; N *Schoenoplectus mucronatus*, inflorescence x 1; O *Lipocarpa microcephala*, nut x 25.

pale brown, membranous, ovate, \pm acute, mucronulate, 3.5–4 mm long; hypogynous bristles 5 or 6, retrorsely barbed, slightly longer than nut; stamens 3; stigmas 2 or 3. Nuts dark brown, plano-convex, broadly obovate, apiculate, smooth. **Fig. 41N.**

Widespread in Moreton and Wide Bay districts, in damp often shady areas. The species can block the flow of water in drainage channels.

5. *Schoenoplectus litoralis* (Schrader) Palla

Scirpus litoralis Schrader

Rhizomatous stout perennial; stems erect, terete but obtusely trigonous immediately below inflorescence, easily compressible, 0.6–1.5 m tall, 3–10 mm thick. Leaves reduced to sheathing scales or short erect blades. Inflorescences pseudolateral simple or compound umbels of few–many spikelets, involucre bract 1, continuous with stem, usually just overtopping inflorescence; spikelets terete, ovoid to obloid, \pm acute, 0.8–1.2 cm \times 0.3–0.4 cm, many-flowered; glumes brown, ovate, obtuse, midnerve prominent, ending in short mucro, *ca* 3.5 mm long; hypogynous bristles 4–6, *ca* as long as nut, plumose with long antrorse ferruginous hairs; stamens 2 or 3; stigmas 2. Nuts dark brown, plano-convex to unequally biconvex, obovoid. **Fig. 41F.**

Widespread in Moreton and Wide Bay districts, in swampy areas, also recorded from Ban Ban Springs in Burnett district.

6. *Schoenoplectus validus* (Vahl) A. Löve & D. Löve

Scirpus validus Vahl

Rhizomatous stout perennial; stems close together, erect, terete, easily compressed, 0.6–1.6 m tall, 5–10 mm thick. Leaves reduced to sheathing bracts or very short blades. Inflorescences pseudolateral compound umbels of many spikelets, involucre bract 1, shorter than inflorescence and continuous with stem; spikelets solitary or in clusters of 2 or 3, terete, ovoid to obloid-ovoid, \pm acute, 0.5–1.5 cm \times *ca* 0.4 cm, many-flowered; glumes brown, oblong-ovate, prominent midrib produced into short mucro, 3–4 mm long; hypogynous bristles 5 or 6, slightly longer than nut, retrorsely barbed; stamens 3; stigmas 2. Nuts grey to dark brown, plano-convex to biconvex, obovate, apiculate, smooth. **Fig. 41H.**

Widespread in the region, in swampy areas.

9. ISOLEPIS R. Br.

Annual or perennial herbs, terrestrial or aquatic, rhizomatous or tufted; stems erect, procumbent, submerged or floating. Leaves developed or reduced to sheathing bracts. Inflorescences terminal or pseudolateral, subtended by an involucre bract continuous with stem or ebracteate; spikelets solitary or clustered, terete or angular, few–many-flowered, flowers bisexual; glumes imbricate all round persistent rachis, caducous; hypogynous bristles absent; stamens 1–3; style slender, not thickened towards base, stigmas 2 or 3. Nuts variable.

About 70 species, mainly southern hemisphere, especially Africa and Australia; 28 species Australia; 6 species south-eastern Queensland.

All species are known as CLUB RUSHES.

- | | |
|---|-------------------------|
| 1. Stigmas 2; spikelet 1; involucre bracts mostly shorter than inflorescences or absent | 1. <i>I. fluitans</i> |
| Stigmas 3; spikelets 1–12, rarely –15; involucre bracts longer than inflorescences | 2 |
| 2. Nuts globular with longitudinal striations and transversely ribbed | 2. <i>I. hookeriana</i> |
| Nuts plano-convex, triquetrous or trigonous, smooth | 3 |
| 3. Nuts plano-convex, 3-ribbed but dorsal angle inconspicuous; spikelets 1–3, 2–3 mm long | 3. <i>I. cernua</i> |
| Nuts triquetrous or trigonous; spikelets 1–12, 3–10 mm long | 4 |

4. Erect plants with creeping rhizomes; stems (30–)35–90 cm tall, 1.5–3 mm thick; inflorescences dense globose heads; glumes 2 mm long; plants mostly of coastal sands and swamps

4. *I. nodosa*

Small erect or oblique or floating plants, densely tufted; stems 10–25(–35) cm tall, 0.3–1 mm thick; inflorescences consisting of 1–12 spikelets; glumes 1–1.5 mm long; plants of damp, muddy situations

5

5. Stems 0.5–1(–1.2) mm thick; leaves mostly reduced to sheaths but uppermost sometimes with short blades; spikelets in clusters of 3–12

5. *I. inundata*

Stems filiform, up to 0.4 mm thick; leaves developed; spikelets in clusters of 1–3

6. *I. subtilisima*

1. *Isolepis fluitans* (L.) R. Br.

FLOATING CLUB RUSH

Scirpus fluitans L.

Perennial; stems weak, up to 40 cm long when floating in water, stouter, more tufted and shorter when terrestrial. Leaves filiform, 1–6 cm long. Spikelets solitary, terminal, 3–5 mm × 2–3 mm, ebracteate but occasionally lowest empty glume produced into short erect lamina, borne on pseudolateral peduncle up to 10 cm long; glumes membranous, ovate, obtuse, 2–2.5 mm long; stamens 2 or 3; stigmas 2. Nuts pale brown, ellipsoid to slightly obovoid, biconvex, apiculate, smooth.

Collected once in the region, from near Ballandean in south-eastern Darling Downs district.

2. *Isolepis hookeriana* Boeck.

Scirpus hookerianus (Boeck.) S. T. Blake; *S. calocarpus* S. T. Blake; *S. setaceus* auct. non L.

Annual; stems densely tufted, erect to oblique, filiform, 3–12 cm long, *ca* 0.2 mm thick. Leaves filiform but mainly reduced to short mucro. Inflorescences pseudolateral, involucre bract 1, slightly longer than inflorescence, caducous; spikelets 1 or 2, ovoid to obloid, obtuse, angular, 2.5–3.5 mm × *ca* 1.5 mm; glumes membranous, ovate, obtuse, 1.25–1.5 mm long; stamens 3; stigmas 3. Nuts dark brown, globular, indistinctly trigonous, longitudinally striate, with numerous transverse bars. **Fig. 41E.**

Collected twice in the region, from the Wyberba-Wallangarra area of south-eastern Darling Downs district.

3. *Isolepis cernua* (Vahl) Roemer & Schultes

NODDING CLUB RUSH

Scirpus cernuus Vahl; *S. psammophilus* S. T. Blake

Annual; stems tufted, erect to oblique, filiform, up to 20 cm long, *ca* 0.3 mm thick. Leaves short or reduced. Inflorescences pseudolateral, involucre bract 1, slightly longer than inflorescence, caducous; spikelets 1–3, ovate, 2–3 mm long; glumes few, brown or pale coloured, ovate, mucro 1–1.5 mm long; stamens 2 or 3; stigmas 3. Nuts stramineous to dark brown, ovoid, plano-convex, 3-ribbed but dorsal angle inconspicuous, finely reticulate. **Fig. 41L.**

Recorded from Stradbroke I. and also Cunninghams Gap.

4. *Isolepis nodosa* (Rottb.) R. Br.

KNOBBY CLUB RUSH

Scirpus nodosus Rottb.

Perennial with long creeping rhizomes; stems erect, rigid, terete, 30–90 cm tall, 1.5–3 mm thick. Leaves reduced to sheathing scales. Inflorescences pseudolateral dense globose heads, involucre bract 1, similar to and continuous with stem, overtopping inflorescence by 1–3 cm; spikelets mostly numerous, brown, obloid-ovoid, terete, ± acute, 3–10 mm × 2–2.5 mm; glumes ovate, obtuse, *ca* 2 mm long; stamens 3; stigmas 3. Nuts shining black, ovoid, plano-convex to trigonous. **Fig. 41K.**

Moreton district, in sandy coastal areas, common, also known from Fraser I. in Wide Bay district.

5. *Isolepis inundata* R. Br.

SWAMP CLUB RUSH

Scirpus inundatus (R. Br.) Poiret; *Isolepis gunnii* Steudel

Perennial; stems tufted, slender, erect, 5–35 cm tall, 0.5–1 mm thick. Leaves usually all reduced to sheathing bracts, upper sometimes produced into short blades. Inflorescences pseudolateral, involucre bract continuous with stem but finally pushed aside by maturing

inflorescence; spikelets 3–12, ovoid-obloid, somewhat angular, 3–4 mm long; glumes membranous, ovate, obtuse, sides with purplish streaks; stamens 1 or 2; stigmas 3. Nuts pale yellow, ovoid, triquetrous, occasionally dorsal angle somewhat flattened, smooth. **Fig. 41G.**

Moreton, Wide Bay and southern and eastern Darling Downs districts, on edges of creeks and swamps.

6. *Isolepis subtilissima* Boeck.

Scirpus subtilissimus (Boeck.) S. T. Blake; *S. merrillii* (Palla) Kükenthal

Perennial; stems tufted, erect, filiform, up to 10 cm long, *ca* 0.3 mm thick. Leaves with short blades. Inflorescences pseudolateral, involucre bract continuous with stem; spikelets 1–3, ovoid, terete, *ca* 3 mm × 1–1.5 mm; glumes membranous, ovate, obtuse, 1–1.25 mm long, sides stained purplish; stamens 1 or 2; stigmas 3. Nuts yellow, ovoid, triquetrous with rib-like angles, apiculate, *ca* as long as subtending glume, smooth.

Collected twice in the region, from near Killarney in south-eastern Darling Downs district.

10. ELEOCHARIS R. Br.

Annual or perennial leafless herbs, perennials often producing stolons and rhizomes; stems usually tufted or in a linear series. Leaves reduced to bladeless tubular sheaths often with short mucro. Inflorescences solitary, terminal, ebracteate, consisting of few–many bisexual flowers on persistent rachilla; glumes spirally-imbricate, sometimes subdistichous, lowest 1 or 2 usually sterile and more persistent than others; perianth absent or of 1–10 hypogynous bristles; stamens 1–3; style glabrous, stigmas 2 or 3, usually fimbriate. Nuts obovate to orbicular or pyriform, lenticular to triquetrous, crowned by dilated style base.

About 200 species, cosmopolitan; *ca* 30 species Australia; 19 species south-eastern Queensland.

All species are known as SPIKERUSHES.

1. Stems transversely septate	2
Stems not transversely septate	5
2. Glumes <i>ca</i> 8 mm long; stems in a close linear series on stout horizontal rhizome	1. <i>E. sphacelata</i>
Glumes less than 8 mm long; stems tufted, not on stout rhizome	3
3. Glumes <i>ca</i> 2.8 mm long	2. <i>E. blakeana</i>
Glumes 4.2–6.5 mm long	4
4. Glumes rounded at apex, flattened when dry, not shining, 6–6.5 mm long; hypogynous bristles strongly connate at base; stolons sometimes bearing tubers	3. <i>E. dulcis</i>
Glumes subtruncate, ± shining, 4.2–5 mm long; hypogynous bristles free from each other at base; stolons never bearing tubers	4. <i>E. equisetina</i>
5. Styles 2-fid	6
Styles 3-fid	8
6. Stems 1–3 mm thick, strongly 3–5-angled; glumes 4–5 mm long; stout plants up to 100 cm tall	5. <i>E. philippinensis</i>
Stems 1 mm or less thick, ± terete, striate but not angled, glumes less than 2 mm long; slender plants 5–40 cm tall	7
7. Annuals; spikelets globose to ovoid, reddish brown; nuts shining black when mature	6. <i>E. geniculata</i>
Perennials; spikelets ovoid to obloid-ovoid, dark; nuts olive-green to dark green when mature	7. <i>E. minuta</i>
8. Uppermost leaf sheath loose, obtuse or acute, frequently scarious, not mucronate	9
Uppermost leaf sheath firm, oblique or truncate, with distinct mucro 1–4 mm long	13

- | | | |
|--|-------------------------------|----|
| 9. Stems 1.5–3 mm thick, distinctly 3–5-angled | 5. <i>E. philippinensis</i> | 10 |
| Stems 0.5–1.5 mm thick, striate or grooved but not angled | | |
| 10. Stems 0.7–1.5 mm thick | | 11 |
| Stems up to 0.7 mm thick | | 12 |
| 11. Stolons often bearing tubers; nuts seldom maturing, but when present trigonous with no bristles; spikelets often proliferating; glumes reddish brown and streaked with linear red-brown glands | 8. <i>E. atricha</i> | |
| Stolons never bearing tubers; nuts maturing, biconvex, with 6 bristles; spikelets not proliferating; glumes yellow with green midvein | 9. <i>E. ochrostachys</i> | |
| 12. Glumes 4–5 mm long; nuts biconvex with margins ribbed; hypogynous bristles 5 or 6, as long as or longer than nut | 10. <i>E. difformis</i> | |
| Glumes 1.7–2.2 mm long; nuts trigonous with 3 or 4 vertical ribs on each face; hypogynous bristles very small or absent | 11. <i>E. pusilla</i> | |
| 13. Stems 0.5–1 mm thick | | 14 |
| Stems 1 mm or more thick | | 16 |
| 14. Spikes usually pallid; glumes 2.9–3.5 mm long; nuts biconvex | 12. <i>E. pallens</i> | |
| Spikes brown; glumes 3.3–3.6 mm long; nuts trigonous | | 15 |
| 15. Stems 0.5–0.6(–0.8) mm thick, deeply striate; leaf sheaths oblique at orifice; hypogynous bristles longer than nut | 13. <i>E. gracilis</i> | |
| Stems 0.7–1 mm thick, 6–9-fluted; leaf sheaths truncate at orifice; hypogynous bristles shorter than nut | 14. <i>E. dietrichiana</i> | |
| 16. Stems with 3 or 4 distinct angles | | 17 |
| Stems \pm terete or flat | | 18 |
| 17. Stems 3-angled; leaf sheath mucro up to 4 mm long; glumes 3.3–3.4 mm long, densely spirally packed, cuneate, rounded or subtruncate | 15. <i>E. spiralis</i> | |
| Stems 4-angled; leaf sheath mucro short, <i>ca</i> 1 mm long; glumes 3.7–4.2 mm long, not so densely packed, obtuse to acute | 16. <i>E. tetraquetra</i> | |
| 18. Glumes <i>ca</i> 2.5 mm long, obtuse; nuts 1–1.2 mm long | 17. <i>E. cylindrostachys</i> | |
| Glumes 3.3–4 mm long, acute; nuts 1.2–1.8 mm long | | 19 |
| 19. Spikelets 0.6–1 cm long; stems 6–9-fluted; bristles $\frac{1}{2}$ – $\frac{3}{4}$ length of nut | 14. <i>E. dietrichiana</i> | |
| Spikelets 1–2 cm long; stems striate; bristles as long as or longer than nut | | 20 |
| 20. Stems terete but trigonous under inflorescences, 1–2 mm thick; spikelets 2.5–3.5 mm wide, wider than stem; glumes 3.5–4.2 mm long | 18. <i>E. acuta</i> | |
| Stems usually flat, (1.5–)2–4 mm thick; spikelets 2–2.5 mm wide, scarcely wider than stem; glumes 3.4–3.7 mm long | 19. <i>E. plana</i> | |

1. *Eleocharis sphacelata* R. Br.**TALL SPIKERUSH**

Rhizomes stout, 5–6 mm diameter, never producing tubers; stems in a close linear series, erect, terete, up to 2 m tall, 0.4–1.2 cm thick, transversely septate. Leaf sheaths thin, orifice oblique. Spikelets cylindrical, acute, *ca* 3.5 cm \times 0.8–0.9 cm, many-flowered; glumes hard, oblong-obovate, obtuse, margin hyaline, 8–8.5 mm long, midrib prominent; hypogynous bristles 8–10, strongly united at base; stamens 3, anthers linear with acute appendage; styles 3-fid. Nuts yellowish, turgidly biconvex, broadly obovate in outline, margin minutely ribbed, 2.2–2.5 mm \times 1.8–2.2 mm; style base flat, *ca* $\frac{2}{3}$ as wide as and up to $\frac{1}{2}$ as long as nut. **Fig. 421.**

Widespread in Moreton, Darling Downs and Wide Bay Districts, in damp places.

2. *Eleocharis blakeana* L. A. S. Johnson & O. D. Evans

Rhizomes short; stems tufted, erect, subterete, 30–40 cm tall, *ca* 1 mm thick, striate with *ca* 14 ribs, transversely septate. Leaf sheaths purplish, membranous, truncate, mucronate.

Spikelets pale, linear-cylindrical, *ca* 1.2 cm \times 0.15–0.2 cm; glumes usually pallid, acute, margin hyaline, *ca* 2.8 mm long; hypogynous bristles 5 or 6, mostly shorter than nut; stamens 3, anthers linear with minute setaceous appendage; styles 3-fid. Nuts stramineous, biconvex, obovate in outline, margin ribbed, *ca* 1.2 mm \times *ca* 1 mm; style base small, conical, $\frac{1}{5}$ length of nut. **Fig. 42L.**

Restricted to western Darling Downs district and extreme south-western Burnett district.

3. *Eleocharis dulcis* (N. L. Burm.) Trin. ex Henschel CHINESE WATER CHESTNUT *Andropogon dulce* N. L. Burm.; *Eleocharis tuberosa* (Roxb.) Roemer & Schultes; *E. sphacelata* auct. non R. Br.

Stolons slender, sometimes bearing tubers; stems tufted, erect, cylindrical but flat when dry, up to 1 m tall, 3–8 mm thick, striate, transversely septate. Leaf sheaths thin, orifice oblique. Spikelets pallid, cylindrical, obtuse, 2.5–5 cm \times 0.3–0.7 cm, many-flowered; glumes hard, not shining, oblong to oblong-ovate, rounded at apex, 6–6.5 mm long; hypogynous bristles 6–8, longer than nut and style base, united at base; stamens 3, anthers linear with acute appendage; styles 3-fid. Nuts tawny, biconvex, obovate to orbicular in outline, margin not ribbed, 1.5–2 mm \times 1.2–1.8 mm; style base flattened, $\frac{2}{3}$ as wide as and $\frac{1}{2}$ to as long as nut. **Fig. 42H.**

Eastern Moreton and Wide Bay districts, in damp places.

4. *Eleocharis equisetina* Presl.

Eleocharis plantaginoides (Rottb.) Domin; *E. sphacelata* auct. non R. Br.

Stolons slender; stems tufted, erect, terete, up to 1 m tall, 1–3 mm thick, longitudinally striate, transversely septate. Leaf sheaths with oblique orifice. Spikelets pallid, cylindrical, \pm acute, 2–4 cm \times *ca* 0.25 cm, many-flowered; glumes pallid, shining, cartilaginous, broadly elliptic or slightly obovate, subtruncate, 4.2–5.2 mm long; hypogynous bristles 6 or 7, as long as nut and style-base, not connate at base; stamens 3, anthers with setaceous appendage; styles 3-fid. Nuts golden brown, biconvex, margin ribbed, 1.8–2.1 mm \times 1.3–1.4 mm; style base flattened, triangular, *ca* as long as and $\frac{1}{2}$ – $\frac{2}{3}$ as wide as nut. **Fig. 42G.**

Widespread in Moreton and Wide Bay districts; common.

5. *Eleocharis philippinensis* Svenson

Stolons 1–1.5 mm diameter; stems tufted, erect, lax, acutely and unequally 4- or 5-angled, up to 1 m tall, 2–3 mm thick. Leaf sheaths thin, lax, orifice oblique. Spikelets green, linear, acute, up to 6 cm \times *ca* 0.3 cm, many-flowered; glumes hard, remote, oblong-ovate, margin hyaline, 4.1–4.8 mm long; hypogynous bristles 6 or 7, $\frac{1}{2}$ as long as or longer than nut; stamens 3; styles 2- or 3-fid. Nuts dark brown, turgidly biconvex, obovate in outline, margin slightly ribbed, 1.5–1.7 mm \times 1.5–1.6 mm, deeply pitted; style base flattened, *ca* $\frac{1}{2}$ as long as and $\frac{2}{3}$ – $\frac{3}{4}$ as wide as nut. **Fig. 42N.**

Widespread in Moreton, Darling Downs and Wide Bay districts, in damp areas.

6. *Eleocharis geniculata* (L.) Roemer & Schultes

Scirpus geniculatus L.; *Eleocharis caribaea* (Rottb.) S. F. Blake

Annual; stems tufted, oblique to erect, up to 40 cm tall, *ca* 0.7 mm thick, angular-striate. Leaf sheaths purplish at base, orifice oblique. Spikelets reddish brown, globose to ovoid, 4–5 mm \times 3.5–4 mm; glumes membranous, very obtuse, 1.8–2 mm long; hypogynous bristles 6–8, white, as long as or longer than nut; stamens 2 or 3, anthers minutely apiculate; styles 2-fid. Nuts shining black, biconvex with faintly ridged margin, 0.9–1 mm \times 0.7–0.8 mm; style base white, conical to ovoid, *ca* $\frac{1}{5}$ as long as and *ca* $\frac{1}{3}$ as wide as nut. **Fig. 42F.**

Moreton and Wide Bay districts, in damp muddy areas close to the coast where brackish water conditions prevail.

7. *Eleocharis minuta* Boeck.

Eleocharis maidenii Kükenthal; *E. atropurpurea* auct. non Kunth; *E. ocreata* auct. non Nees

Perennial; stems tufted, erect, angular-sulcate, 5–15 cm tall, 0.4–0.6 mm thick, angular-

sulcate. Leaf sheaths purplish at base, scarious at apex, orifice oblique. Spikelets dark, ovoid or obloid-ovoid, obtuse, 3–7 mm \times ca 2 mm, densely flowered; glumes membranous, obtuse, 1.7–1.8 mm long; hypogynous bristles 5–7, ca as long as nut, united at base; stamens 2, anthers minutely apiculate; styles 2-fid. Nuts olive-green to dark green, turgidly biconvex, obovate in outline, margin ribbed, 0.9–1 mm \times 0.6–0.7 mm; style base conical, acuminate, ca $\frac{1}{6}$ as long as and ca $\frac{1}{3}$ as wide as nut. **Fig. 42M.**

Widespread in damp places near the coast in Moreton and Wide Bay districts, in damp places near the coast.

8. *Eleocharis atricha* R. Br.

TUBER SPIKERUSH

Stolons ca 0.7 mm diameter, bearing ovoid tubers; stems tufted, oblique to erect or recurved, 3–40 cm tall, 0.7–1.5 mm thick, angular-sulcate. Leaf sheaths membranous, scarious at apex, orifice oblique. Spikelets chestnut-brown, ovate to linear, acute, 1–2 cm \times 0.2–0.3 cm; glumes membranous, oblong or oblong-ovate, sides stained reddish brown and streaked with linear red-brown glands, 3.5–5 mm long; hypogynous bristles absent; stamens 3, anthers shortly apiculate; styles 3-fid. Nuts seldom maturing, white to pallid stramineous, trigonous, sides prominently vertically ribbed but seldom maturing, 0.75–1 mm \times ca 0.7 mm; style bases pyramidal-deltoid. **Fig. 42S.**

Southern Moreton district and south-eastern Darling Downs district, in damp areas.

9. *Eleocharis ochrostachys* Steudel

Rhizomes slender; stems tufted, erect, terete but becoming flat, striate, ca 35 cm tall, 1–1.2 mm thick, striate. Leaf sheaths membranous, loose, scarious at apex, orifice oblique. Spikelets pale green, linear, acute, broader than stem, 1.2–2 cm \times 0.15–0.2 cm, few-flowered; glumes hard, oblong-obovate, obtuse, margin hyaline, ca 4 mm \times ca 2 mm; hypogynous bristles 5 or 6, longer than nut and style base; stamens 2; styles 3-fid. Nuts brown, turgidly unequally biconvex, obovate in outline, margin ribbed, 1.3–1.5 mm \times ca 1.2 mm; style base deltoid, flattened, $\frac{1}{4}$ – $\frac{1}{3}$ as long as nut.

Moreton and Wide Bay districts, in near coastal swamps; not common.

10. *Eleocharis difformis* S. T. Blake

Rhizomes slender, creeping; stems tufted, subterete, slightly trigonous, oblique or erect, up to 30 cm tall, very lax, filiform when submerged and up to 1 m long, 0.5–0.7 mm thick. Leaf sheaths thin, scarious, orifice oblique. Spikelets green, linear to linear-ovate, acute, 0.5–1.2 cm \times 0.13–0.15 cm, few-flowered; glumes hard, oblong-obovate, obtuse, margin hyaline, 4–5 mm long; hypogynous bristles 5 or 6, as long as or longer than nut and style base; stamens 3, anthers minutely apiculate; styles 3-fid. Nuts pallid, biconvex, margin ribbed, 1.3–1.5 mm \times 0.8–1 mm; style base triangular, flattened, $\frac{1}{4}$ – $\frac{1}{3}$ as long as nut. **Fig. 42U.**

Known only from Stradbroke I. in Moreton district.

This species is closely related to *Eleocharis ochrostachys* Steudel and may not be specifically distinct from it.

11. *Eleocharis pusilla* R. Br.

SMALL SPIKERUSH

Rhizomes slender; stems tufted, erect to curved, capillary, 2–15 cm tall, up to 0.5 mm thick. Leaf sheaths loose, scarious, orifice oblique. Spikelets ovate, acute, 2–7 mm \times 1.5–1.7 mm, few-flowered; glumes pallid to deep brown, membranous, 1.7–2.2 mm long; hypogynous bristles very small or absent; stamens 3, anthers minutely apiculate; styles 3-fid. Nuts pale stramineous, obscurely trigonous, 0.7–1.1 mm \times 0.45–0.5 mm, sides with 3 or 4 vertical ribs; style base ovoid, small. **Fig. 42O.**

Darling Downs district and western Moreton district, in damp areas.

12. *Eleocharis pallens* S. T. Blake

PALE SPIKERUSH

Rhizomes very short; stems densely tufted, erect, slender, subterete, up to 50 cm tall, 0.6–1 mm thick, longitudinally 9–10-grooved. Leaf sheaths firm, with erect mucro up to 2 mm long, truncate at orifice. Spikelets brown but usually pallid, linear-cylindrical, acute, 1–2 cm \times ca 0.2 cm; glumes brown, membranous, apex acute, margin hyaline, 3–3.5 mm

long; hypogynous bristles 7–10, shorter or longer than nut; stamens 3, anthers linear, with short appendage; styles 3-fid. Nuts brown, biconvex, margin ribbed, 1.1–1.4 mm \times 0.9–1 mm; style base \pm deltoid, compressed, $\frac{1}{3}$ as long as and $\frac{1}{3}$ – $\frac{3}{4}$ as wide as nut. **Fig. 42T.**

Widespread in Darling Downs district, in damp places.

13. *Eleocharis gracilis* R. Br.

SLENDER SPIKERUSH

Rhizomes creeping, 2–3 mm diameter, densely clothed with pale brown to purplish, ovate, striate scales; stems tufted, erect or curved, slender, up to 20 cm tall, 0.5–0.6 mm thick, deeply striate. Leaf sheaths mucronate, orifice oblique. Spikelets brown, ovoid to oblong, subacute, usually 5–9 mm \times 2–2.5 mm, but can be larger; glumes membranous, dense, lower ones obtuse, upper subacute, margin hyaline, 3.3–3.6 mm long; hypogynous bristles 5 or 6, usually overtopping style base; stamens 3, anthers minutely apiculate; styles 3-fid. Nuts tawny or brown, trigonous and 3-ribbed, 1.2–1.3 mm \times 0.8–0.9 mm; style base stout, pyramidal, $\frac{1}{2}$ – $\frac{2}{3}$ as wide as and *ca* $\frac{1}{2}$ as long as nut. **Fig. 42J.**

Near Wallangarra in south-eastern Darling Downs district, in damp situations.

14. *Eleocharis dietrichiana* Boeck.

Rhizomes short, horizontal; stems tufted, erect, subterete, up to 30 cm tall, 0.7–1 mm thick, prominently 6–9-fluted. Leaf sheaths purplish, membranous, prominently mucronate, truncate at orifice. Spikelets dark brown, ovate or oblong, acute to obtuse, 6–9 mm \times 2–3 mm; glumes membranous, triangular, acute, margin hyaline, 3.3–3.6 mm long; hypogynous bristles 6, *ca* $\frac{1}{2}$ as long as nut; stamens 3, anthers prominently apiculate with setaceous appendage; styles 3-fid. Nuts tawny to dark brown, trigonous, 1.2–1.4 mm \times 0.7–0.8 mm; style base short, pyramidal, $\frac{1}{2}$ as wide as nut. **Fig. 42K.**

Moreton district and south-eastern Darling Downs district, in damp places.

15. *Eleocharis spiralis* (Rottb.) Roemer & Schultes

Scirpus spiralis Rottb.

Stolons 3–4 mm diameter; stems tufted, erect, trigonous or triquetrous, 30–50 cm tall, 2–3.5 mm thick. Leaf sheaths firm, mucro up to 4 mm long, orifice oblique. Spikelets pallid, subacute in flower, obtuse in fruit, 1.5–3.5 cm \times 0.4–0.6 cm, many-flowered; glumes pallid, hard, margin hyaline, 3.3–3.8 mm long; hypogynous bristles 5 or 6, as long as or shorter than nut; stamens 3, anthers with ovate or triangular appendage; styles 3-fid. Nuts stramineous, biconvex, 1.5–1.7 mm \times 1.2–1.4 mm; style-base triangular, confluent over shoulders of nut, $\frac{1}{3}$ as long as and $\frac{1}{2}$ as wide as nut. **Fig. 42R.**

Along the coast from Noosa Heads northwards, in Wide Bay district, in damp places.

16. *Eleocharis tetraquetra* Nees

Rhizome short, descending; stolons slender, covered with long narrow scales; stems tufted, erect, regularly tetraquetrous, 30–100 cm tall, 0.9–1.5 mm thick. Leaf sheaths purplish, with short erect mucro, orifice truncate. Spikelets brown, ellipsoid to ovoid, acute, 1–2 cm \times 0.35–0.5 cm, many-flowered; glumes membranous, elliptic to oblong-elliptic, obtuse, margin narrow, scarious, 3.7–4.2 mm long; hypogynous bristles 6–8, $\frac{1}{2}$ – $\frac{3}{4}$ as long as nut; stamens 3, anthers minutely apiculate; styles 3-fid. Nuts yellowish to brown, trigonous, dorsal angle not prominent, 1.5–1.6 mm \times 1–1.1 mm; style base deltoid, sometimes as wide as nut. **Fig. 42P.**

Moreton and Wide Bay districts, in damp places.

17. *Eleocharis cylindrostachys* Boeck.

Rhizomes very short; stems tufted, erect, subterete, striate, 30–50 cm tall, 1–1.7 mm thick, striate. Leaf sheaths with prominent rigid mucro, orifice oblique or truncate. Spikelets pallid, linear-cylindrical, obtuse, 1–2 cm \times 0.25–0.3 cm, many-flowered; glumes membranous, ovate, obtuse, margin broadly hyaline, 2.2–2.5 mm long; hypogynous bristles 8–9, *ca* as long as nut and style base; stamens 3, anthers minutely apiculate; styles 3-fid. Nuts yellowish, turgidly biconvex, margin ribbed, 1.1–1.25 mm \times 0.7–0.9 mm; style base ovoid but flattened, $\frac{1}{3}$ – $\frac{1}{2}$ as long as and $\frac{1}{2}$ – $\frac{2}{3}$ as wide as nut. **Fig. 42V.**

Widespread throughout the region.

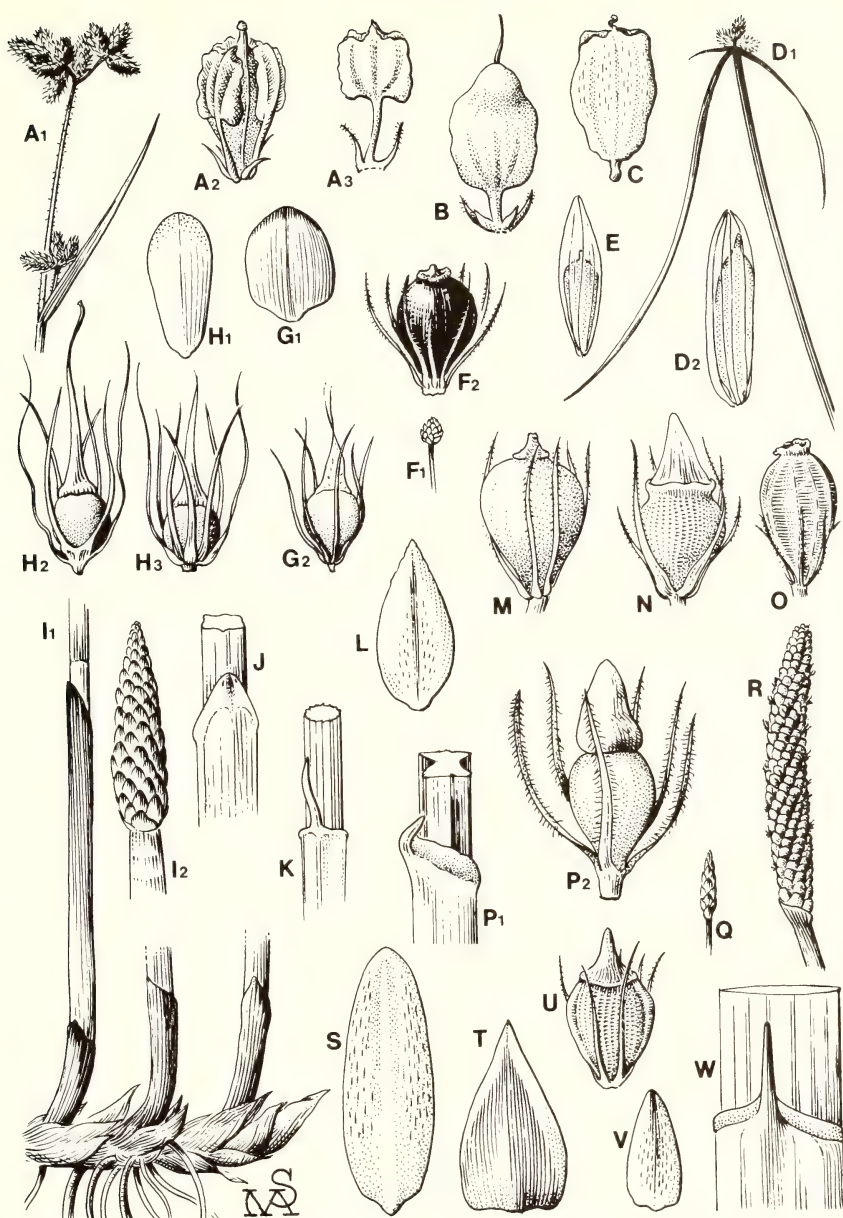


Fig. 42 CYPERACEAE — A-C *Fuirena* spp. — A₁-A₃ *F. ciliaris*, A₁ inflorescence x 1, A₂ nut with hypogynous scales x 25, A₃ hypogynous scale x 25; B *F. incrassata*, hypogynous scale x 17; C *F. umbellata*, hypogynous scale x 17; D-E *Lipocarpa* spp. — D₁-D₂ *L. microcephala*, D₁ spike x 1, D₂ nut with hypogynous scales x 25; E *L. chinensis*, nut with scales x 12; F-W *Eleocharis* spp. — F₁-F₂ *E. geniculata*, F₁ inflorescence x 1, F₂ nut with hypogynous bristles x 17; G₁-G₂ *E. equisetina*, G₁ glume x 3, G₂ nut with hypogynous scales x 6; H₁-H₃ *E. dulcis*, H₁ glume x 3, H₂ nut with hypogynous bristles viewed from one side x 6, H₃ nut with hypogynous bristles viewed from opposite side to view in H₁ x 6; I₁-I₂ *E. sphacelata*, I₁ part of rhizome with bases of culms showing sheaths x 1/2, I₂ inflorescence x 1; J *E. gracilis*, apex of sheath x 6; K *E. dietrichiana*, apex of sheath with prominent mucro x 6; L *E. blakeana*, glume x 8; M *E. minuta*, nut with hypogynous bristles x 12; N *E. philippinensis*, nut with hypogynous bristles x 12; O *E. pusilla*, nut with hypogynous bristles x 25; P₁-P₂ *E. tetraquetra*, P₁ sheath with mucro x 6, P₂ nut with hypogynous bristles x 12; Q *E. acuta*, inflorescence x 1; R *E. spiralis*, inflorescence x 1; S *E. atricha*, glume x 6; T *E. pallens*, glume x 6; U *E. difformis*, nut with hypogynous bristles x 12; V *E. cylindrostachys*, glume x 6; W *E. plana*, sheath with prominent mucro x 6.

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| 9. Stigmas 2 | | 10 |
| Stigmas 3 | | 17 |
| 10. Style bases with numerous long white hairs hanging over nut | | 8. <i>F. velata</i> |
| Style bases with no hairs hanging over nut | | 11 |
| 11. Nuts smooth or finely reticulate | | 12 |
| Nuts distinctly longitudinally striate and transversely latticed | | 15 |
| 12. Glumes less than 2 mm long | | 9. <i>F. aestivalis</i> |
| Glumes more than 2 mm long | | 13 |
| 13. Glumes glabrous, 4–6 mm long | | 4. <i>F. tristachya</i> |
| Glumes ciliate on margin, tomentose or puberulous at apex, 3–4.5 mm long | | 14 |
| 14. Glumes minutely ciliate on margins, puberulous at apex; nuts oblong-ovobate to obovate in outline, stramineous to dusky | | 10. <i>F. ferruginea</i> |
| Glumes densely tomentose at apex; nuts obovate to orbicular in outline, white | | 11. <i>F. sieberiana</i> |
| 15. Spikelets 1–1.5 mm wide, angular; glumes sharply keeled | | 12. <i>F. bisumbellata</i> |
| Spikelets 2–3 mm wide, terete; glumes scarcely keeled except towards apex | | 16 |
| 16. Perennials; plant \pm glabrous; styles 1.5–2 times longer than nuts | | 13. <i>F. dichotoma</i> |
| Annuals; whole plant \pm villous; styles shorter than or \pm equal to nuts | | 14. <i>F. depauperata</i> |
| 17. Style base with hairs pendant over nut | | 15. <i>F. furva</i> |
| Style base glabrous | | 18 |
| 18. Glumes <i>ca</i> 6 mm long | | 7. <i>F. brownii</i> |
| Glumes 1–3 mm long | | 19 |
| 19. Glumes <i>ca</i> 1 mm long; nuts <i>ca</i> 0.5 mm long | | 16. <i>F. microcarya</i> |
| Glumes 1.5–3 mm long; nuts more than 0.5 mm long | | 20 |
| 20. Stems with 1–3 spikelets | | 5. <i>F. polytrichoides</i> |
| Stems with numerous spikelets | | 21 |
| 21. Spikelets 0.25–0.35 cm long | | 17. <i>F. miliacea</i> |
| Spikelets 0.8–2 cm long | | 18. <i>F. vagans</i> |
| 22. Inflorescences 1 or more times compound; spikelets <i>ca</i> 1 mm wide | | 19. <i>F. cinnamometorum</i> |
| Inflorescences usually of single terminal spikelet, sometimes with 1 or 2 lateral spikelets; spikelets 2–4 mm wide | | 23 |
| 23. Leaves reduced to loose, scarious sheaths; glumes 6–6.5 mm long; styles <i>ca</i> 5 mm long, not fimbriate, style bases slightly dilated | | 7. <i>F. brownii</i> |
| Leaves with distinct blades up to several cm long; glumes 4.5–6 mm long; styles <i>ca</i> 4 mm long, fimbriate, style bases strongly dilated | | 20. <i>F. ovata</i> |

1. *Fimbristylis nuda* Boeck.

Annual; stems densely tufted, erect or oblique, up to 12 cm tall, *ca* 0.3 mm thick. Leaves few, shorter than stems or reduced to sheathing scales. Inflorescences solitary terminal spikelets, involucre bract 1, much shorter than spikelet; spikelets erect or oblique, brown, ovoid, obtuse, 4–5 mm long, many-flowered; glumes broadly ovate, obtuse, apiculate, readily deciduous, 1.5 mm long; stamen 1; styles flattened, broad, fimbriate, strongly dilated at base; stigmas 2. Nuts shining white, biconvex, obovate in outline, with 4 transverse wavy ridges. **Fig. 43F.**

Known from a few places in the Moreton and Darling Downs districts.

2. *Fimbristylis acicularis* R. Br.

Annual; stems densely tufted, oblique, filiform, 5–20 cm tall, *ca* 0.25 mm thick. Leaves nearly all reduced to sheaths, but occasionally with filiform blades. Inflorescences a solitary terminal spikelet, involucre bract 1, glume-like and shorter than spikelet; spikelet erect, shining, pale green, very narrowly ovoid, 4–6 mm \times *ca* 2 mm; glumes membranous, few, *ca* 4 mm long; stamen 1; styles very slender, dilated at base, glabrous, stigmas 2. Nuts white with transverse wavy ridges. **Fig. 43E.**

Widespread in Moreton and Wide Bay districts.

3. *Fimbristylis nutans* (Retz.) Vahl

Scirpus nutans Retz.

Perennial; stems densely tufted, obtusely 3–4-angled, 15–50 cm tall, 0.3–1 mm thick. Leaves reduced to sheathing scales. Inflorescences a solitary terminal spikelet, involucre bract 1, shorter than spikelet; spikelets nodding, brown, ovoid to narrowly ovoid, 0.5–1.5 cm \times 0.3–0.5 cm, many-flowered; glumes chartaceous, obtuse, 3.5–4.5 mm long; stamens 3; styles flat, broad, not dilated at base, fimbriate, stigmas 2. Nuts white, biconvex, obovate in outline, tuberculate. **Fig. 43D.**

Widespread in eastern Moreton and Wide Bay districts; moderately common.

4. *Fimbristylis tristachya* R. Br.

Perennial; stems tufted, ridged, thickened at base, 20–60 cm tall, *ca* 1 mm thick. Leaves few or reduced to sheathing scales. Inflorescences a solitary terminal spikelet or several spikelets, involucre bract 1, shorter or slightly longer than spikelet; spikelets pale brown, \pm ovoid, acute, 0.6–2 cm \times 0.4–0.6 cm, many-flowered; glumes chartaceous, obtuse, 4–6 mm long; stamens 3; style flattened, fimbriate, stigmas 2. Nuts biconvex, obovate in outline, distinctly stipitate, smooth. **Fig. 43L.**

Eastern Moreton and Wide Bay districts; moderately common.

5. *Fimbristylis polytrichoides* (Retz.) R. Br.

Scirpus polytrichoides Retz.

Perennial; stems densely tufted, erect or oblique, 5–30 cm long, *ca* 1 mm thick. Leaves filiform, shorter than stem. Inflorescences a solitary terminal spikelet, rarely with 1 or 2 lateral spikelets; involucre bract 1, often overtopping spikelet but caducous; spikelets erect, pale brown, \pm cylindrical, acute, 5–10 mm \times 2–3 mm, many-flowered; glumes membranous, obtuse, 2.5–3 mm long; stamens 1 or 2; styles slender, flattened, fimbriate at top, stigmas 2. Nuts stramineous to dark brown, biconvex, obovate in outline, tuberculate, reticulate. **Fig. 43G.**

Moreton and Wide Bay districts, in swampy coastal areas, often near mangroves.

6. *Fimbristylis pauciflora* R. Br.

Perennial; stems densely tufted, forming large clumps, erect to oblique, filiform, 3–15 cm tall, 0.25–0.5 mm thick. Leaves few or reduced to sheathing scales. Inflorescences a solitary terminal spikelet, involucre bracts 1 or 2, glume-like, shorter than spikelet and caducous; spikelets pale, erect, very narrow, oblong, \pm cylindrical, 4–6 mm \times 1–1.5 mm; glumes cartilaginous, 2.5–3 mm long; stamen 1; styles slightly thickened at base, scarcely fimbriate, stigmas 3. Nuts dark brown, obovoid, obtusely trigonous with convex faces, verruculose. **Fig. 43J.**

Moreton and Wide Bay districts, in swampy near-coastal areas.

7. *Fimbristylis brownii* Benth.

Perennial; stems densely tufted, erect to oblique, filiform, 15–35 cm tall, 0.3–0.5 mm thick. Leaves reduced to sheathing scales. Inflorescences a solitary terminal spikelet or with 2 or 3 additional ones, involucre bracts 2, much shorter than spikelet; spikelets pale brown, erect, narrowly ovoid but flattened, 0.8–1.8 cm \times 0.2–0.3 cm; glumes membranous, narrowly ovate, acute, *ca* 6 mm long; stamens 3; style slender, nearly glabrous except at dilated base, stigmas 3. Nuts pale brown, obovoid, trigonous, verruculose. **Fig. 43H.**

Widespread in eastern Moreton and Wide Bay districts, in swampy areas.

8. *Fimbristylis velata* R. Br.

Fimbristylis squarrosa Vahl var. *esquarrosa* Makino; *F. squarrosa* var. *velata* (R. Br.) C. B. Clarke

Annual; stems densely tufted, erect to curved, slender, 5–25 cm long, *ca* 0.25 mm thick. Leaves shorter than inflorescences, sheaths and frequently leaf blades pubescent. Inflorescences 1 or more times compound with several–many spikelets, involucre bracts 3–7, as long as or shorter than inflorescence, dilated at base and pubescent, primary rays of inflorescence up to 6; spikelets solitary, pale brown, narrowly ovoid, angular, 4–8 mm \times 1–1.5 mm, many-flowered; glumes membranous, ovate to oblong-ovate, acute, mucronate, 1.5–2 mm long; stamen 1; styles slender, flattened, sparsely fimbriate at top, but base with whorl of long white hairs pendant over nut, stigmas 2. Nuts brown, biconvex with acute edges, obovate in outline, smooth, finely reticulate. **Fig. 43M.**

Widespread in Moreton district, also known from near Chinchilla in western Darling Downs district, in swampy places.

9. *Fimbristylis aestivalis* (Retz.) Vahl**SUMMER FRINGERUSH**

Scirpus aestivalis Retz.

Annual; stems slender, densely tufted, 5–30 cm tall, 0.2–0.3 mm thick. Leaves filiform, much shorter than stems, pubescent. Inflorescences compound, loose, involucre bracts up to 6, shorter than or overtopping inflorescences, dilated at base; primary rays of inflorescence 3–9, filiform, glabrous; spikelets solitary, pale brown, ovoid to obloid-ovoid, angular, acute, 3–7 mm \times 1–1.5 mm, many-flowered; glumes membranous, mucronate, 1.25–1.5 mm long; style sparsely fimbriate at top, stigmas 2. Nuts pale brown, biconvex with acute edges, obovate in outline, minutely reticulate, smooth. **Fig. 43I.**

Widespread in the region but not common.

10. *Fimbristylis ferruginea* (L.) Vahl

Scirpus ferruginea L.

Perennial with creeping rhizome; stems forming tufts, rigid, 20–65 cm long, 1–2 mm thick, striate. Leaves few, shorter than stems, rigid, with brown membranous sheath. Inflorescences simple or subcompound, involucre bracts 2 or 3, suberect, shorter to slightly longer than inflorescence; spikelets solitary, brown, ovoid to obloid-ovoid, 0.5–2 cm \times 0.3–0.4 cm, many-flowered; glumes subchartaceous, ovate, apiculate, often ciliolate on upper edges, puberulous at apical point, sometimes subglabrous, 3–4.5 mm long; stamens 3; styles flat, densely fimbriate, stigmas 2. Nuts stramineous to dusky, biconvex, oblong-obovate to obovate in outline, smooth, shortly stipitate. **Fig. 43W.**

Widespread and common in Moreton and Wide Bay districts, also known from south-eastern Darling Downs district.

11. *Fimbristylis sieberiana* Kunth

Perennial with creeping rhizome; stems forming tufts, rigid, striate, up to 65 cm long, 1–2 mm thick, striate. Leaves few, cauline leaves well developed, shorter than stems, sheaths pilose. Inflorescences simple or compound, involucre bracts 2 or 3, lowest usually distinctly longer than inflorescence; spikelets solitary, brown, ovoid to obloid-ovoid, obtuse, 0.5–2 cm \times 0.3–0.4 cm, many-flowered; glumes broadly ovate, subchartaceous, densely tomentose towards apex, 3–4.5 mm long; stamens 3; styles flattened, densely fimbriate, stigmas 2. Nuts very pale brown to white, biconvex, orbicular to obovate in broad outline, umbonate, smooth, distinctly stipitate. **Fig. 43O.**

Known from few records in Moreton and Burnett districts.

12. *Fimbristylis bisumbellata* (Forssk.) Bubani

Scirpus bisumbellatus Forssk.

Annual; stems slender, densely tufted, 7–25 cm tall, 0.5–1 mm thick. Leaves shorter than inflorescence, flat. Inflorescences 1 or more times compound, loose, with many spikelets, involucre bracts 2 or 3, lowest exceeding inflorescence; spikelets solitary, obloid-ovoid to obloid, angular, 3–8 mm \times *ca* 1.5 mm; glumes membranous, glabrous, mucronulate, margin hyaline, 1.5 mm long; stamen 1; style slender, flattened, fimbriate in upper half,

dilated at base, stigmas 2. Nuts very pale brown to whitish, obovate in outline, umbonulate, conspicuously longitudinally striate, transversely ridged. **Fig. 43P.**

Known from a few places in the vicinity of Brisbane and also from central Darling Downs district.

13. *Fimbristylis dichotoma* (L.) Vahl

COMMON FRINGERUSH

Scirpus dichotomus L.; *Fimbristylis diphylla* (Retz.) Vahl

Perennial; stems slender to stout, tufted, 10–75 cm tall, 1–2 mm thick, glabrous. Leaves varying in length, weak or rigid. Inflorescences simple or 1 or more times compound, involucre bracts 2–5, variable in length; spikelets pale to dark brown, solitary or aggregated, ovoid to obloid-ovoid, acute, 5–10 mm \times 2.5–3 mm, many-flowered; glumes chartaceous, obtuse, mucronulate, 2–3 mm long, glabrous; stamens 1–3; styles flattened, longer than nut, slightly dilated at base, fimbriate in upper part, stigmas 2. Nuts white to pale yellow, biconvex, obovate or broadly obovate in outline, umbonulate, longitudinally striate and transversely ridged. **Fig. 43K.**

Widespread and common in the region.

14. *Fimbristylis depauperata* R. Br.

Fimbristylis dichotoma (L.) Vahl subsp. *depauperata* (R. Br.) Kern; *F. annua* auct. non Roemer & Schultes, S. T. Blake

Annual; stems slender to stout, tufted, 15–40 cm tall, ca 0.5 mm thick, softly hairy. Leaves variable, softly hairy. Inflorescences simple or 1 or more times compound, rays softly hairy; involucre bracts 2–5, variable in length, softly hairy; spikelets pale brown, ovoid to obloid-ovoid, acute, 5–10 mm \times 2.5–3 mm, many-flowered; glumes chartaceous, broadly ovate, obtuse, mucronulate, ciliate on upper margin, 2–3 mm long; stamens 1–3, styles flat, short, stigmas 2. Nuts white to pale yellow, biconvex, obovate or broadly obovate in outline, umbonate, longitudinally striate, transversely ridged. **Fig. 43V.**

Known from a few localities around Brisbane in Moreton district and also recorded from Bundaberg in Wide Bay district.

15. *Fimbristylis furva* R. Br.

Perennial; stems tufted, 10–40 cm tall, 0.5–1 mm thick. Leaves flat, shorter than stems, 2–4 mm wide. Inflorescences simple or compound, fairly dense, involucre bracts very small and glume-like or the lower 1 or 2 produced into short point; spikelets solitary, \pm dark brown, ovoid to obloid-ovoid, acute, 4–8 mm \times ca 2 mm; glumes membranous, obtuse, mucronulate, margin ciliate, 2.25–3 mm long; stamens 2 or 3; styles slender, fimbriate in upper part, hispidulous at base with hairs pendant over nut. Nuts black, obovoid, obtusely trigonous, umbonulate, smooth to scaly verruculose. **Fig. 43U.**

Known from a few near coastal areas to the north of Brisbane in Moreton district.

16. *Fimbristylis microcarya* F. Muell.

Fimbristylis complanata (Retz.) Link var. *microcarya* C. B. Clarke

Annual; stems slender, tufted, weak, 10–30 cm tall, 0.75–1.25 mm thick. Leaves shorter than stems, flat, 1–2.5 mm wide. Inflorescences several times compound, very loose, with many spikelets; involucre bracts 2–4, erect, shorter than inflorescence, primary rays slender; spikelets solitary, brown, ovoid to obloid-ovoid, angular, acute, 2–4 mm \times ca 1 mm; glumes membranous, broadly ovate, acute, mucronulate, ca 1 mm long; stamens 1; styles triquetrous, dilated at base, glabrous, stigmas 3. Nuts white, trigonous, sides convex, obovoid, umbonate, tuberculate. **Fig. 43Q.**

Widespread but not common in the region.

17. *Fimbristylis miliacea* (L.) Vahl

Scirpus miliaceus L.; *Fimbristylis quinquangularis* (Vahl) Kunth

Annual; stems erect, densely tufted, acutely 4- or 5-angled, up to 60 cm tall, ca 1.3 mm thick. Leaves of sterile shoots well developed, those of flowering shoots reduced to long sheaths. Inflorescences compound, open, with many spikelets, involucre bracts 2 or 3, shorter than inflorescence, primary rays of inflorescence obliquely spreading; spikelets solitary, ovoid, acute, 2.5–3.5 mm \times 1.5–2 mm, many-flowered; glumes membranous, ovate, obtuse, apiculate, margin hyaline, 1.5 mm long; stamens 1 or 2; style triquetrous,

slightly dilated at base, entire or fimbriate towards apex, stigmas 3. Nuts whitish, obovoid, obtusely trigonous, umbonate, verruculose, shortly stipitate. **Fig. 43R.**

Recorded once from the region, from near Bundaberg in Wide Bay district.

18. *Fimbristylis vagans* S. T. Blake

Perennial, stoloniferous, stolons 2.5 mm thick; stems solitary, distant, erect, up to 60 cm tall, *ca* 0.5 mm thick. Leaves several, stiff, erect, shorter than stem. Inflorescences 1 or more times compound, involucre bracts 1 or 2, primary rays of inflorescence 4–10; spikelets solitary, brown, narrowly cylindrical, 0.5–2 cm \times 0.13–0.2 cm, many-flowered; glumes membranous, ovate, obtuse, mucronulate, 2.3–2.5 mm long; stamens 3; styles triquetrous, slender, entire or rarely fimbriate, stigmas 3. Nuts white to stramineous, obovate in outline, trigonous, longitudinally striate, transversely tuberculate, shortly stipitate. **Fig. 43S.**

Western Darling Downs district; rare.

19. *Fimbristylis cinnamometorum* (Vahl) Kunth

Scirpus cinnamometorum Vahl; *Fimbristylis cyperoides* R. Br.

Perennial; stems solitary, slender, 25–50 cm tall, 0.5–1 mm thick. Leaves at least $\frac{1}{2}$ length of stem, erect, very narrow. Inflorescences 1 or more times compound, loose, with many spikelets; involucre bracts 1 or 2, shorter than or slightly longer than inflorescence, primary rays 5–8; spikelets solitary, oblong or oblong-linear in outline, strongly compressed, acute, *ca* 4.5 mm \times *ca* 1 mm, 2–4-flowered; glumes membranous, \pm ovate, acute, 2.75–4 mm long, with densely reddish gland-dotted sides; stamens 3; style slender, glabrous except for shortly hairy base, stigmas 3. Nuts yellow to brown, obloid-ovoid, trigonous, umbonate, verruculose, shortly stipitate. **Fig. 43T.**

Widespread in eastern Moreton district east of about Brisbane and in eastern Wide Bay district.

20. *Fimbristylis ovata* (N. L. Burm.) Kern

Carex ovata N. L. Burm.; *Fimbristylis monostachya* Hassk.

Perennial; stems densely tufted, 15–40 cm tall, 0.5–1 mm thick. Leaves shorter than stems, *ca* 1 mm wide. Inflorescences consisting of solitary terminal spikelets, sometimes with 1 or 2 lateral spikelets; spikelets pale yellow, \pm ovate in outline, strongly flattened, acute, 0.8–1.5 cm \times 0.2–0.4 cm; glumes subcoriaceous, broadly ovate, acute, mucronate, 4.5–5 mm long; stamens 2 or 3; styles triquetrous, slightly dilated at base, fimbriate, stigmas 3. Nuts white or pale yellow, obovoid or globular, obtusely trigonous, umbonate, tuberculate. **Fig. 43N.**

Widespread in Moreton district, also known from few localities in Burnett district.

A specimen collected from near Gayndah in the Burnett district has more than one spikelet per stem, spikelets not clustered, each spikelet 3–4 mm wide, glumes orbicular and spirally arranged, stigmas 2 and with nuts 3–4 mm wide and conspicuously longitudinally striate and latticed. This taxon probably represents an undescribed species.

12. BULBOSTYLIS Kunth

Annual or perennial herbs; stems tufted, erect, slender, striate or grooved. Leaves filiform, sheaths generally with long white hairs at orifice. Inflorescences terminal, capitate or with lateral axes exceeding main axis; spikelets angular, several-many-flowered, flowers bisexual, rachilla persistent, narrowly winged; glumes with strong midnerve, caducous; hypogynous scales or bristles absent; stamens 1–3, anthers oblong or linear, with shortly produced connective; style articulate with ovary, slender, glabrous, style base incrassate, swollen, remaining on nut as a button, stigmas 3. Nuts obovoid or pyriform, trigonous or triquetrous.

About 100 species, tropical and subtropical regions of the world; 5 species Australia; 3 species south-eastern Queensland.

- | | |
|--|-------------------------|
| 1. Inflorescences capitate, with 4–20 digitate spikelets; nuts obovoid, reticulate | 1. <i>B. barbata</i> |
| Inflorescences with lateral axes exceeding main axis, open, sometimes spikelets reduced to 1; nuts pyriform or obovoid | 2 |
| 2. Stems and leaves with fine white hairs over entire length; glumes 2.8–3.2 mm long, ciliate; nuts pyriform, frequently verrucose | 2. <i>B. pyriformis</i> |
| Stems and leaves glabrous; glumes 1.5–2 mm long, glabrous; nuts obovoid, minutely gland-dotted | 3. <i>B. densa</i> |

1. *Bulbostylis barbata* (Rottb.) C. B. Clarke

Scirpus barbatus Rottb.; *Fimbristylis barbata* (Rottb.) Benth.

Annual; stems filiform, 4–25 cm tall, 0.25–0.35 mm thick, glabrous. Leaves much shorter than stems, glabrous except for long white hairs at sheath orifice. Inflorescences capitate, consisting of 4–20 spikelets, involucre bracts 1–3, 1 usually exceeding inflorescence; spikelets brown, oblong in outline, 3–8 mm × 1–1.5 mm; glumes membranous, ovate, mucronate, 1.5–2.25 mm long; stamens 1; style glabrous. Nuts white to stramineous, obovoid, triquetrous, 0.5–0.7 mm × ca 0.5 mm, smooth, finely reticulate. **Fig. 43A.**

Widespread throughout the region, in damp sandy positions.

2. *Bulbostylis pyriformis* S. T. Blake

Annual; stems filiform, 8–30 cm tall, ca 0.3 mm thick, finely hairy. Leaves much shorter than stems, with fine white hairs and with long white hairs at sheath orifice. Inflorescences simple or subcompound, consisting of 1–5 spikelets, involucre bracts few, 1 usually exceeding inflorescence; spikelets reddish brown, oblong-ovate in outline, angular, 7–10 mm × ca 2.3 mm; glumes green, membranous, ovate, minutely mucronulate, 2.8–3.2 mm long, ciliate; stamens 3; style slender, glabrous. Nuts white to stramineous, pyriform, trigonous, apex truncate, lower half sharply attenuate, 1.3–1.4 mm × ca 1 mm, mostly verrucose. **Fig. 43C.**

Collected at Crows Nest in western Moreton district.

3. *Bulbostylis densa* (Wall.) Hand.-Mazz.

Scirpus densus Wall.; *Fimbristylis capillaris* A. Gray

Annual; stems 0.5–2 cm long, 0.25–0.35 mm thick. Leaves much shorter than stems, glabrous except for long white hairs at sheath orifice. Inflorescences simple or subcompound, consisting of 1–10 spikelets, involucre bracts few and very short; spikelets brownish, oblong-ovate in outline, 3–5 mm × 1.75–2 mm; glumes reddish brown, membranous, ovate, ciliate, 1.75–2 mm long, ciliate; stamens 2 or 3; style glabrous. Nuts stramineous, obovoid, triquetrous, 0.7–0.9 mm × 0.5–0.8 mm, minutely dotted. **Fig. 43B.**

Widespread in Darling Downs and Moreton districts, in damp situations.

13. TRACHYSTYLIS S. T. Blake

Perennial rhizomatous herbs; stems tufted, erect. Inflorescences umbellate; spikelets mostly 1-flowered, bisexual; glumes spirally imbricate, uppermost empty, intermediate 1, rarely 2 fertile, lowermost empty; hypogynous scales or bristles absent; stamens 2; style conically dilated towards base, articulating from nut, stigmas 2. Nuts large, flattened.

A monotypic genus restricted to coastal regions of eastern Queensland, occurring in south-eastern Queensland.

1. *Trachystylis stradbokensis* (Domin) Kükenthal

Cladium stradbokensis Domin; *Trachystylis foliosa* S. T. Blake; *Machaerina stradbokensis* (Domin) Koyama

Stems trigonous, smooth, 10–40 cm tall, 0.8–1 mm thick. Leaves 4–6, margin scabrid, uppermost usually with blade up to 20 cm × 0.05 cm. Inflorescences simple or subcompound, consisting of 4–8 rays each up to ca 1 cm long, subtended by erect bract 1–3.5 cm long; spikelets solitary, ± ovoid, somewhat compressed, acuminate, ca 5 mm ×



Fig. 43 CYPERACEAE — A-C *Bulbostylis* spp. — A₁-A₂ *B. barbata*, A₁ plant x $\frac{2}{3}$, A₂ nut and T.S. of nut x 17; B₁-B₂ *B. densa*, B₁ part of inflorescence x $\frac{2}{3}$, B₂ nut and T.S. of nut x 17; C *B. pyriformis*, nut and T.S. of nut x 17; D-W *Fimbristylis* spp. — D *F. nutans*, inflorescence x $\frac{2}{3}$; E₁-E₂ *F. acicularis*, E₁ inflorescence x $\frac{2}{3}$, E₂ spikelet x 4; F *F. nuda*, nut with style and T.S. of nut x 17; G *F. polytrichoides*, nut and T.S. of nut x 17; H *F. brownii*, nut and T.S. of nut x 8; I₁-I₂ *F. aestivalis*, I₁ inflorescence x $\frac{2}{3}$, I₂ nut and T.S. of nut x 17; J *F. pauciflora*, nut and T.S. of nut x 17; K₁-K₂ *F. dichotoma*, K₁ nut with style and T.S. of nut x 8, K₂ texture of nut x 34; L₁-L₂ *F. tristachya*, L₁ nut with style x 8, L₂ texture of nut x 34; M *F. velata*, nut with style and T.S. of nut x 17; N *F. ovata*, nut and T.S. of nut x 5; O *F. sieberana*, nut and T.S. of nut x 8; P₁-P₂ *F. bisumbellata*, P₁ part of inflorescence x $\frac{2}{3}$, P₂ nut and T.S. of nut x 17; Q *F. microcarya*, nut with style and T.S. of nut x 17; R₁-R₂ *F. miliacea*, nut with style and T.S. of nut x 17, R₂ texture of nut x 34; S₁-S₂ *F. vagans*, S₁ nut with style and T.S. of nut x 17, S₂ texture of nut x 34; T *F. cinnamometorum*, inflorescence x $\frac{2}{3}$; U *F. furva*, nut with style x 17; V₁-V₂ *F. depauperata*, V₁ nut with style x 8, V₂ texture of nut x 17; W₁-W₃ *F. ferruginea*, W₁ plant x $\frac{2}{3}$, W₂ nut and T.S. of nut x 8, W₃ texture of nut x 34.

- [illegible]

12. Spikes ovoid or obloid-ovoid, 1–1.4 cm long; rays 4–6; 2 or 3 fertile glumes on either side of rachis 58. *C. leiocaulon*
 Spikes cylindrical to ovoid, 1.5–4 cm long; rays 5–12, fertile glumes occupying whole spikelet apart from small sterile glume at base 59. *C. cyperoides*
13. Rachillas persistent on rachis after glumes and nuts have fallen; glumes less than 2 mm long; lowermost spikelet never strongly reflexed 17. *C. distans*
 Rachillas falling off as a whole with glumes and nuts; glumes more than 2 mm long; lowermost spikelet frequently strongly reflexed 14
14. Stems densely tufted, lax, oblique, *ca* 1 mm wide; leaves 1–2 mm wide 56. *C. bowmannii*
 Stems not densely tufted, robust, erect, *ca* 2–4 mm wide; leaves 2–7 mm wide 55. *C. dietrichiae*
15. Spikes contracted and dense; spikelets numerous, 2.5–6 mm long, usually hiding the 1–1.5 cm long rachis, 1–6-, rarely 7–10-flowered 16
 Spikes more open, spikelets few-many, sometimes reflexed, (3–)6 mm or more long, not hiding the 0.8–several cm long rachis, 6–many-flowered 19
16. Spikes 1–4, rarely –8, contracted, sessile, not on rays; stems and bracts not minutely papillose; plants not glaucous 60. *C. flavus*
 Spikes 4 or more, sessile or pedunculate, mostly on long rays; stems and bracts minutely papillose; plants glaucous 17
17. Inflorescences simple, occasionally subcompound; spikes usually shortly cylindrical, 1–1.5 (–2) cm \times 0.6–0.7(–1) cm 45. *C. tetracarpus*
 Inflorescences one or more times compound; spikes ovoid, conical or broadly cylindrical, 1–2.5 cm \times 0.8–2 cm 18
18. Spikelets very dense, 1- or 2-flowered, 2.5–3 mm \times 1–1.5 mm; fertile glumes *ca* 2 mm long; involucre bracts spinulose 68. *C. conicus*
 Spikelets less dense, 6–10-flowered, 5–10 mm \times 2–2.5 mm; fertile glumes 2.5 mm or more long; involucre bracts scabrous 44. *C. javanicus*
19. Spikelets 0.6–1.1 mm wide 20
 Spikelets 1.2–2.5 mm wide 21
20. Glumes $\frac{1}{3}$ imbricate or less; rachillas flexuose, each segment of rachilla falling off separately when mature 69. *C. odoratus*
 Glumes $\frac{1}{2}$ imbricate; rachillas straight, not segmenting when mature 2. *C. digitatus*
21. Spikes cylindrical, broadly cylindrical, ovoid or ovoid-cylindrical; spikelets firm 22
 Spikes broadly ovoid or obloid-ovoid; spikelets loose 28
22. Rachises of spikes distinctly hispid 19. *C. pilosus*
 Rachises of spikes not distinctly hispid 23
23. Glumes 4–5 mm long, usually rich reddish brown, occasionally light brown; nuts narrowly obloid, 2.2–2.7 mm long 47. *C. lucidus*
 Glumes 3.5 mm or less long, greenish or yellow-brown; nuts ellipsoid or obovoid, up to 1.5 mm long 24
24. Leaves strongly septate-nodulose; stems densely papillose; spikelets 2 mm or more wide; glumes 2.5–3.5 mm long 44. *C. javanicus*
 Leaves not septate-nodulose; stems not papillose; spikelets up to 2 mm wide; glumes up to 2.2 mm long 25
25. Rachillas wingless; glumes broadly ovate to nearly orbicular, cellular-reticulate, sides nerveless with hyaline margin, 1.25–1.5 mm long 20. *C. iria*
 Rachillas winged; glumes elliptic or ovate, not cellular-reticulate, sides nearly nerveless to several-nerved, 1.5–2.2 mm long 26

26. Spikes lax, spreading; spikelets subdistichous and finally nearly at right angles to rachis; rachis visible; nuts less than 1 mm long 4. *C. exaltatus*
 Spikes tight, erect or suberect; spikelets dense and not spreading; rachis not clearly visible; nuts more than 1 mm long 27
27. Plants 0.6–1 m tall; glumes mucronate; anther connective smooth 16. *C. eleusinoides*
 Plants 1–1.2 m or more tall; glumes blunt; anther connective setulose 3. *C. ohwii*
28. Plants with rhizomes producing tubers; rachillas persistent after glumes and nuts have fallen 29
 Plants with or without rhizomes but not producing tubers; rachillas persistent or disarticulating 34
29. Culms \pm terete, becoming trigonous just below inflorescence, easily compressible; leaves usually less than $\frac{1}{2}$ length of culm or blades absent; inflorescences simple; involucre bracts often pushing inflorescence to one side; nuts 2–3 times as long as broad 30
 Culms triquetrous or trigonous throughout, not easily compressible; leaves well developed, more than $\frac{1}{2}$ as long as to longer than culm; inflorescences simple or compound, involucre bracts spreading, not pushing inflorescence to one side; nuts *ca* 1.5 times as long as broad 31
30. Leaves short or none; spikelets mostly 1–1.5 cm long; nuts ellipsoid and not always maturing; mostly coastal plants preferring brackish conditions 14. *C. scarious*
 Leaves developed to $\frac{1}{2}$ length of culm; spikelets mostly 1.5–3(–4) cm long; nuts narrowly obovoid and maturing; plants mostly preferring heavy clay soils in western parts of the region 15. *C. victoriensis*
31. Tubers globular to ovoid, with grey tomentum; glumes golden yellow to pale brown; rachis frequently hispid 13. *C. esculentus*
 Tubers \pm ellipsoid, without grey tomentum; glumes deep dark brown to pale brown; rachis not hispid 32
32. Glumes mostly dark brown, never yellowish, appressed to glume above, nerves on $\frac{1}{3}$ – $\frac{1}{2}$ of each side; nuts seldom maturing 10. *C. rotundus*
 Glumes pale yellowish brown to rusty brown, never dark brown, soon spreading and margins inrolling, nerves on $\frac{1}{2}$ – $\frac{2}{3}$ of each side; nuts usually maturing 33
33. Glumes when flattened broadest at middle, not much narrowed below, nerves on $\frac{1}{2}$ – $\frac{2}{3}$ of each side, outside nerves short and close to base 11. *C. bifax*
 Glumes when flattened broadest well below middle, distinctly narrowed below, nerves on *ca* $\frac{1}{2}$ of each side with no short nerves near base 12. *C. tuberosus*
34. Glumes broadly ovate to nearly orbicular, 1.25–1.5 mm long, keel very arched 20. *C. iria*
 Glumes ovate, 1.8 mm or more long, keel \pm straight 35
35. Spikelets 2–3 mm wide; glumes dark brown with broad white hyaline margin; robust plants 60–150 cm tall; leaves 0.2–1.5 cm wide 18. *C. procerus*
 Spikelets up to 2 mm wide; glumes whitish, yellowish, reddish brown or yellow, sides not with broad white hyaline margin; plants up to 60 cm tall; leaves 0.1–0.5 cm wide 36
36. Glumes *ca* $\frac{1}{8}$ imbricate, 3–3.5 mm long, apex of lower glumes on one side of rachilla slightly overlapping base of glume above; stem base usually bulbous 37
 Glumes *ca* $\frac{1}{3}$ imbricate, up to 3 mm long, apex of glumes not as above; stem thickened but not bulbous 38
37. Spikelets 1–1.2 mm wide, \pm circular in cross section; glumes minutely mucronulate, sides reddish brown 54. *C. subulatus*
 Spikelets 1.5–2 mm wide, rhombic in cross section; glumes acute, sides yellowish 5. *C. tenuiculmis*

38. Annuals with fibrous roots; glumes with greenish keels and whitish sides, frequently with purplish spot on side of some glumes; leaves not septate-nodulose; nuts *ca* $\frac{1}{2}$ as long as glumes 6. *C. sphacelatus*
 Perennials with rhizomes; glumes yellowish to brown or fulvous; leaves septate-nodulose; nuts nearly as long as glumes 62. *C. perangustus*
39. Inflorescences solitary globose whitish spikes with numerous stellately arranged spikelets 43. *C. pulchellus*
 Inflorescences solitary non whitish spikes of 1–12 digitate spikelets, or with spikes on rays 40
40. Inflorescences of globose spikes of many densely stellately arranged spikelets on rays 41
 Inflorescences solitary spike of *ca* 1–12 digitately arranged spikelets, or umbel-like with few rays bearing spikes of few spikelets 46
41. Glumes 0.6–0.9 mm long 39. *C. difformis*
 Glumes 1.8–2.5 mm long 42
42. Spikes 1.5 cm or more wide 43
 Spikes less than 1.5 cm wide 45
43. Glumes *ca* $\frac{1}{2}$ imbricate; leaves and bracts strongly septate-nodulose 66. *C. gunnii*
 Glumes *ca* $\frac{2}{3}$ imbricate; leaves and bracts not strongly septate-nodulose 44
44. Spikes in dense heads; spikelets *ca* 50 per spike; nuts shining pearl coloured 24. *C. eragrostis*
 Spikes not in dense heads; spikelets 3–12 per spike; nuts with corky angles, ventral side concave, angles yellow, remainder dark brown to black 22. *C. platystylis*
45. Plants up to 0.6 m tall; inflorescences simple or compound; leaves and bracts septate-nodulose; stems scabrous at apex 64. *C. fulvus*
 Plants 0.6–1.2 m tall; inflorescences 2 or more times compound; leaves and bracts not septate-nodulose; stems smooth 67. *C. decompositus*
46. Inflorescences with spikes on 4 or more, rarely 3 rays; plants mostly erect, rigid, with stems 1 mm or more thick 47
 Inflorescences of solitary or capitate spikes or with 1–3 short rays; plants rather weak, with stems mostly 0.3–0.8 mm thick, or more robust plants with thick horizontal creeping rhizomes and dark brown glumes 59
47. Glumes with distinct mucro 0.2–0.7 mm long 48
 Glumes blunt or with mucro less than 0.2 mm long 50
48. Spikelets rhombic in cross section; glumes lightly multinerved, green to brown; nuts obovoid; plants of eastern coastline 21. *C. compressus*
 Spikelets biconvex in cross section; glumes strongly 4- or 5-nerved on each side, fulvous or reddish brown; nuts obloid-obovoid or narrowly obloid; plants of drier inland areas 49
49. Spikelets 2.7–3.7 mm wide; glumes 3.3–3.5 mm long including 0.4–0.7 mm long mucro 65. *C. clarus*
 Spikelets 2–2.5 mm wide; glumes 2.8–3.3 mm long including 0.2–0.4 mm long mucro 63. *C. rigidellus*
50. Stems distinctly triquetrous 51
 Stems terete or obtusely trigonous 55
51. Robust leafy plants usually 30–90 cm tall; involucre bracts 5, much longer than inflorescences, 0.3–2 cm wide 52
 Weak plants, few leaves, usually under 30 cm tall, occasionally up to 40 cm tall; involucre bracts 1–3, up to 3 mm wide 54
52. Leaves septate-nodulose; spikelets brown; nuts with corky angles; plants of very boggy areas 22. *C. platystylis*

- Leaves not septate-nodulose; spikelets green to almost black; nuts without corky angles; plants of rainforest 53
53. Spikelets 1.5–2 mm wide; glumes 1.5–2 mm long; nuts as long as glumes, white edge of nut extending beyond margin of glume 52. *C. tetraphyllus*
Spikelets 2.25–3 mm wide; glumes 2.6–3.5 mm long; nuts *ca* $\frac{1}{2}$ length of glumes, edge of nut not usually extending beyond margin of glume 23. *C. pedunculatus*
54. Inflorescences simple or subcompound; stems very weak; glumes 1.5–1.75 mm long, cellular-reticulate; nuts pale brown, minutely tuberculate, *ca* 0.75 mm long 26. *C. aquatilis*
Inflorescences one or more times compound; stems usually erect; glumes 1–1.5 mm long, not cellular-reticulate; nuts whitish becoming yellow, densely granulose, *ca* 0.5 mm long 36. *C. haspan*
55. Inflorescences with 50–100 rays of \pm equal length 38. *C. prolifer*
Inflorescences with fewer rays of unequal length 56
56. Bracts 6–12, 0.4–2 cm wide, subequal, mostly shorter than inflorescence; cultivated plant or garden escape 48. *C. albostratus*
Bracts up to 7, up to 0.4(–0.8) cm wide, unequal, longer than inflorescence 57
57. Leaves not septate-nodulose; spikelets usually rich reddish brown; glumes densely imbricate for $\frac{3}{5}$ their length, *ca* 1.5 mm long 37. *C. concinnus*
Leaves septate-nodulose; spikelets green to brown; glumes imbricate for $\frac{1}{3}$ their length, 1.5–3 mm long 58
58. Stems 15–40 cm tall, *ca* 1 mm wide; inflorescences simple or subcompound; spikelets 0.4–2 cm \times 0.15–0.2 cm; glumes *ca* 1.5 mm long, upper half green, lower half pale or straw coloured 25. *C. trinervis*
Stems 40–60 cm tall, 2–3 mm wide; inflorescences compound; spikelets 1–5 cm \times 0.1–0.12 cm; glumes 2.4–3 mm long, yellowish to brown 61. *C. betchei*
59. Glumes nerveless, often with a reddish brown patch on side; base of bracts pubescent; frequently found in mountainous high rainfall areas 28. *C. laevis*
Glumes nerved, with no reddish patch on side; base of bracts glabrous; plants of mountains or lowlands 60
60. Glumes with numerous nerves over whole side, dark brown; nuts dorsiventrally compressed; plants of mountainous regions 61
Glumes 1–4-nerved on each side, green to light brown; nuts not dorsiventrally compressed; mostly plants of the lowlands (excepting *C. mirus*) 62
61. Spikelets 1–6 per spike, 0.6–1.4 cm long, androgynous, lower half female, upper half male; glumes 1.6–1.7 mm long 51. *C. semifertilis*
Spikelets 4–12 per spike, 0.5–0.6 cm long, bisexual throughout; glumes 1.25–1.5 mm long 50. *C. disjunctus*
62. Glumes with 1 or 2 nerves on each side, sides and margins whitish 63
Glumes with 3 or 4 nerves on each side, sides and margins green 66
63. Glumes *ca* 1.25 mm long, broadly ovate, sides pale brown with one distinct nearly straight median nerve on each side, red glandular-dotted; mature nuts nearly as long as glumes and frequently visible, protruding from margin of glumes; sandy coastal dunes 34. *C. stradbokensis*
Glumes 1.5–2 mm long, ovate, sides and margins whitish, usually 2 slightly curved nerves on each side near keel; mature nut $\frac{2}{3}$ length of glume and only occasionally visible; various habitats 64
64. Base of style curved downwards 31. *C. curvistylis*
Base of style erect 65
65. Glume apices and mucro somewhat recurved and spreading; nuts dark brown to black, longitudinally striate 29. *C. mirus*

- Glume apices tightly appressed to glume above; nuts brown, punctulate 30. *C. enervis*
66. Nuts obovoid, distinctly truncate at apex, smooth or punctulate, external cells minute; glumes 2–2.5 mm long 32. *C. gracilis*
Nuts ellipsoid, coarsely reticulate, external cells large; glumes 1.6–1.9 mm long 33. *C. sculptus*
67. Involucral bracts 12–22; inflorescences one or more times compound 9. *C. involucratus*
Involucral bracts 3–9; inflorescences simple, or one or more times compound 68
68. Involucral bracts 3 or 4, inrolled, thorn-like, 0.1–0.2 cm wide with very short pungent points 8. *C. gymnocaulis*
Involucral bracts 5–9, foliaceous, flat, 0.2–2 cm wide with acuminate tips 69
69. Glumes 1–1.5 mm long; bracts 6–9 70
Glumes 2–3.4 mm long; bracts 5–8 71
70. Involucral bracts mostly shorter or barely as long as inflorescence, 0.4–2 cm wide, with 3 parallel white nerves when dry; glumes *ca* 1.5 mm long 48. *C. albostriatus*
Involucral bracts longer than inflorescence, 0.3–0.5 cm wide, white nerves absent; glumes 1–1.25 mm long 49. *C. filipes*
71. Inflorescences simple; leaves reduced to sheaths; glumes 2–2.75 mm long; widespread 7. *C. vaginatus*
Inflorescences 2 or more times compound; basal leaves longer than inflorescence; glumes 3–3.4 mm long; mountain plants 53. *C. rupicola*
72. Inflorescences capitate, consisting of several dense sessile glomerules forming tight pyramidal or globose heads; bracts 5–7, thickened at base, several small inner bracteoles protruding from inflorescence; glumes $\frac{7}{8}$ imbricate 46. *C. pygmaeus*
Inflorescences not densely capitate, mostly with rays; bracts 1–5, not markedly thickened at base; glumes $\frac{1}{4}$ – $\frac{1}{2}$ imbricate 73
73. Glumes with long straight or recurved mucro 0.4 mm or more long 74
Glumes blunt or with mucro less than 0.4 mm long 78
74. Spikelets 3–4 mm wide, rhombic in cross section; glumes 3–3.8 mm long including mucro 21. *C. compressus*
Spikelets up to 3 mm wide, biconvex in cross section; glumes up to 3 mm long including mucro 75
75. Plants very pale green; involucral bracts 1, rarely 2; glumes cellular reticulate 27. *C. flaccidus*
Plants not pale green; involucral bracts 3–5; glumes not cellular reticulate 76
76. Spikelets up to 1.5 mm wide; glumes usually rich reddish brown, sometimes paler 41. *C. castaneus*
Spikelets 2–3 mm wide; glumes ferrugineous to castaneous 77
77. Rachises of spikes up to 5 mm long; glumes 2.5–3.4 mm long, several-nerved 42. *C. squarrosus*
Rachises of spikes more or less absent; glumes 1.5–2 mm long with one nerve on each side close to green keel 40. *C. cuspidatus*
78. Spikelets spicately arranged on rachis 1–2 cm or more long 79
Spikelets digitately arranged on rachis less than 1 cm long 81
79. Plants 30–90 cm tall; leaves 0.3–1.2 cm wide; inflorescences one or more times compound; spikelets 0.6–1 mm wide; rachilla with thickened corky internodes 69. *C. odoratus*

- Plants 5–60 cm tall; leaves 0.2–0.5 cm wide; inflorescences simple or compound; spikelets 1.5–2 mm wide; rachilla internodes not corky 80
80. Glumes broadly ovate to nearly orbicular, 1.25–1.5 mm long, sides nerveless, without red blotch, keel nerved and arched 20. *C. iria*
 Glumes ovate, 2.3–3 mm long, sides many-nerved, frequently with red blotch on sides of some of glumes in spikelet, keel \pm straight 6. *C. sphacelatus*
81. Inflorescences with 2–6 rays; spikes with 2–14 spikelets; involucre bracts 2, not appearing to continue stem; glumes cellular-reticulate 26. *C. aquatilis*
 Inflorescences solitary spikes, appearing pseudolateral, consisting of 1–3, rarely 4 spikelets; involucre bracts usually 1, appearing to continue stem; glumes not cellular-reticulate 35. *C. tenellus*
82. Nuts with a broad side face to rachilla, dorsiventrally compressed 83
 Nuts with a narrow end to rachilla, laterally compressed 84
83. Small annuals; stems 1–15(–25) cm tall; involucre bracts 5–7, not appearing to continue stem; inflorescences capitate, consisting of several dense glomerules forming tight triangular or globose heads; glumes 1–2 mm long 46. *C. pygmaeus*
 Perennials with long creeping rhizome; stems 15–60 cm tall; involucre bracts 1, rarely 2, appearing to continue stem; inflorescences solitary pseudolateral spikes of 1–20 digitately spreading spikelets; glumes 2–3 mm long 70. *C. laevigatus*
84. Spikelets 1- or 2-, rarely 3-flowered, 0.2–0.35 cm long, falling off as a whole when mature 85
 Spikelets more than 3-flowered, 0.5–1.5 cm long, rachilla persistent at maturity 88
85. Keels of glumes distinctly winged 80. *C. kyllingia*
 Keels of glumes not winged 86
86. Rhizomes very tufted or scarcely creeping; spikes with whitish appearance; nuts black at maturity 77. *C. sesquiflorus*
 Rhizomes creeping; spikes greenish or golden; nuts yellow to dark brown at maturity 87
87. Heads more or less ovoid, 6–7 mm diameter; spikelets up to 100, 1-flowered; glumes greenish, keel prominent and usually denticulate; stamens 1 78. *C. brevifolius*
 Heads globular, 4–6 mm diameter; spikelets up to 50, 1-flowered with a second incomplete flower often present; glumes tending to yellowish often tinged gold, keel smooth, rarely denticulate; stamens 2 or 3 79. *C. sphaeroideus*
88. Glumes with distinct recurved mucro up to 0.4 mm long 72. *C. nervulosus*
 Glumes blunt or mucronulate 89
89. Glumes 3.5 mm or more long 71. *C. unioides*
 Glumes less than 3.5 mm long 90
90. Nuts with transverse wavy, sometimes white ridges; glumes greenish brown 76. *C. flavescens*
 Nuts punctulate, with no wavy ridges; glumes brown or red 91
91. Stems noded at base, sometimes rooting at nodes; glumes with keels curved, sides frequently dark, reddish brown; nuts obovoid to orbicular 74. *C. sanguinolentus*
 Stems not noded at base; glumes with keels straight, sides brown; nuts narrowly obloid, obloid-ovoid to obloid-ellipsoid 92
92. Leaves flat; glumes acute; rachilla flexuous and narrowly winged; spikelets gradually tapering to acute apex; nuts narrowly obloid, truncate, minutely apiculate 73. *C. polystachyos*

Leaves with longitudinal groove; glumes obtuse; rachillas straight and not winged; spikelets parallel-sided; nuts obloid-ellipsoid, umbonate, distinctly apiculate

75. *C. flavidus*

1. **Cyperus papyrus* L.

PAPYRUS

Perennial with thick creeping rhizome; stems rigid, erect, triquetrous, smooth, 2–4 m tall, 1–2 cm thick. Leaves reduced to bladeless sheaths. Inflorescences umbellate, with numerous rays (up to 100 or more) 10–30 cm long, involucre bracts 4–10, much shorter than inflorescence; spikes cylindrical or ovoid, 2–3 cm \times 1–1.5 cm; spikelets linear in outline, 0.6–1.5 cm \times ca 0.1 cm, up to 18-flowered, rachilla broadly winged; glumes 2 mm long, sides yellow-brown; stamens 3; stigmas 3. Nuts dark grey, obloid-ellipsoid, trigonous, $\frac{2}{3}$ length of glumes. **Fig. 44B.**

Native of southern Europe and Africa; cultivated as an ornamental, occasionally found as an escape from cultivation.

2. *Cyperus digitatus* Roxb.

Perennial with short rhizome; stems \pm robust, erect, triquetrous, smooth, 0.5–1.5 m tall, 2–4 mm thick. Leaves flat or folded, \pm equal in length to stem, 2–8 mm wide. Inflorescences 1 or more times compound, with 5–10 unequal primary rays each up to 15 cm long, secondary rays very short, involucre bracts 3–8, lower much longer than inflorescence; spikes cylindrical, of numerous spikelets, 3–6 cm \times 1–2.5 cm, rachis winged; spikelets finally at right angles to rachis, linear in outline, subterete, 0.5–1.2 cm \times ca 0.1 cm, rachilla persistent, winged; glumes 1.75–2 mm long, or sides light yellow to golden or reddish brown; stamens 3; stigmas 3. Nuts grey to yellowish, obloid-ellipsoid, trigonous, $\frac{1}{2}$ length of glumes, side facing rachilla concave or flat, dorsal edge somewhat rounded. **Fig. 44A.**

Known in the region only from the margin of Lake Manchester in Moreton district.

3. *Cyperus ohwii* Kükenthal

Perennial with short rhizome; stems stout, rigid, erect, trigonous, smooth, 1–1.2 m tall, 6–10 mm thick. Leaves flat, 1–1.2 cm wide. Inflorescences 1 or more times compound, with 7–10 unequal suberect rays each up to 15 cm long, involucre bracts 6–8, lower much longer than inflorescence; spikes 4–8, shortly pedunculate, cylindrical, 3–4 cm \times 0.6–1 cm, subtended by small bracts, rachis not visible; spikelets numerous, obliquely spreading, linear-oblong in outline, 5–7 mm \times ca 1.5 mm, 10–16-flowered, rachilla persistent, broadly winged; glumes 1.75–2 mm long, sides reddish to stramineous; stamens 3, anther connective long, setulose; stigmas 3. Nuts grey, obloid-ellipsoid, trigonous, ca $\frac{1}{2}$ length of glumes.

Collected once in the region, from Bundaberg in Wide Bay district.

4. *Cyperus exaltatus* Retz.

TALL FLATSEDGE; GIANT SEDGE

Perennial with short rhizome; stems stout, rigid, erect, trigonous, smooth, 0.3–2 m tall, 4–8 mm thick. Leaves flat, 0.8–1.5 cm wide. Inflorescences 1 or more times compound, with 6–9 unequal primary rays each up to 15(–20) cm long, secondary rays up to 4 cm long, involucre bracts 4–6, lower very long; spikes digitately arranged or solitary on peduncles, spreading, cylindrical, 3–6 cm \times 1–2 cm, rachis visible; spikelets oblique becoming widely spreading, oblong in outline, compressed, 5–10 mm \times 1.2–2 mm, 6–20-flowered, rachilla persistent, winged; glumes 1.5–2 mm long, sides brown, nerveless; stamens 3; stigmas 3. Nuts yellowish brown, ellipsoid, trigonous, shortly apiculate, ca $\frac{1}{3}$ length of glumes. **Fig. 44C.**

Widespread in Moreton and Darling Downs districts, in damp places, also collected once in Burnett district.

5. *Cyperus tenuiculmis* Boeck.

Cyperus rotundus L. var. *carinatus* Benth.

Perennial with creeping rhizome; stems solitary or somewhat tufted, rigid, erect, triquetrous, smooth, 40–60 cm tall, 1–2 mm thick. Leaves several, shorter than inflorescences, 2–4 mm wide. Inflorescences somewhat lax, simple or subcompound, with

terminal spike and 1–6 somewhat erect unequal rays up to 15 cm long, involucre bracts 3–6, lower longer than inflorescence; spikes broadly ovoid, up to 4 cm \times 4 cm, spikelets linear in outline, rhombic in cross section, acute, 1–2.5 cm \times 0.15–0.2 cm, 8–20-flowered, rachilla slightly flexuous, winged; glumes 3–3.5 mm long, sides yellowish; stamens 3; stigmas 3. Nuts dark brown, ellipsoid or slightly obovoid, triquetrous, $ca \frac{1}{2}$ length of glume. **Fig. 44D.**

Eastern Wide Bay district and north-eastern Moreton district in damp areas.

6. *Cyperus sphacelatus* Rottb.

Annual with fibrous roots; stems tufted, rigid, erect, triquetrous, smooth, 10–60 cm tall, 2–3 mm thick. Leaves few, 2–4 mm wide. Inflorescences open, simple or compound, with terminal spike and 3–8 unequal rays each up to 10 cm long, involucre bracts 3–5, lower longer than inflorescence; spikes broadly ovoid, 2(–7) cm \times 3(–5) cm; spikelets linear in outline, subquadrangular, acute, 0.6–2.5 cm \times 0.1–0.2 cm, 8–24-flowered, rachilla flexuous, winged; glumes 2.3–3 mm long, sides white-hyaline frequently with purple blotch; stamens 3; stigmas 3. Nuts shining brown, ellipsoid-obovoid, triquetrous, $ca \frac{1}{2}$ length of glume, sides concave. **Fig. 44H.**

Known from a few places in coastal parts of Moreton and Wide Bay districts.

7. *Cyperus vaginatus* R. Br.

Perennial with creeping rhizome; stems tufted, rigid, erect, subterete, smooth, 30–90 cm tall, 1.5–2 mm thick. Leaves reduced to membranous sheaths. Inflorescences simple, consisting of terminal spike and 0–10 unequal spreading rays each up to 4 cm long, involucre bracts 5–8, up to 10(–15) cm \times 0.2–0.4 cm; spikes broadly ovoid, up to 2 cm \times 2 cm; spikelets oblong-ovate in outline, acute, 0.8–1.8 cm \times 0.2–0.28 cm, 10–44-flowered, rachilla straight, wingless; glumes ca 2 mm long, sides dark or light brown, margin whitish; stamens 3; stigmas 3. Nuts pale brown, ellipsoid, trigonous, $\frac{1}{3}$ length of glume, sides convex. **Fig. 44G.**

Known from several localities in Moreton, Darling Downs and Burnett districts, usually in damp situations.

8. *Cyperus gymnocaulos* Steudel

SPINY FLATSEDGE

Perennial with short rhizome; stems rigid, erect, trigonous at top, striate, smooth, 20–70 cm tall, 1.5–2 mm thick. Leaves reduced to membranous sheaths. Inflorescences single globose spikes or with 1–4 short rays up to 3 cm long, involucre bracts 3 or 4, up to 5 cm long; spikes up to 1 cm \times 1 cm; spikelets ovate to narrowly ovate in outline, somewhat compressed, 3–5.5 mm \times 2.5–3 mm, 8–16-flowered, rachilla straight, wingless; glumes 2–2.75 mm long, sides brown, margin whitish; stamens 3; stigmas 3. Nuts pale brown, ellipsoid or obloid-ellipsoid, trigonous, $ca \frac{1}{2}$ length of glume, sides convex. **Fig. 44E.**

Known from a few scattered localities in Moreton, Darling Downs and Burnett districts, usually in damp situations.

9. **Cyperus involucratus* Rottb.

UMBRELLA SEDGE

Cyperus flabelliformis Rottb.

Perennial with short rhizome; stems tufted, rigid, erect, subterete or trigonous below inflorescence, striate, smooth, 45–90 cm tall, 3–5 mm thick. Leaves reduced to long sheaths. Inflorescences 1 or more times compound, with numerous subequal primary rays each 5–10 cm long, secondary rays 1–2 cm long, involucre bracts 12–22, much longer than inflorescences, up to 1.5 cm wide; spikes hemispherical, up to 2 cm \times 2 cm; spikelets oblong-linear in outline, compressed, 5–10 mm \times ca 2 mm, 20–40-flowered, rachilla straight, wingless; glumes ca 2 mm long, sides pale stramineous, often tinged red; stamens 3; stigmas 3. Nuts yellowish brown, ellipsoid, trigonous, apiculate, $ca \frac{1}{3}$ length of glume. **Fig. 44F.**

Native of Africa; cultivated as an ornamental, found as an escape in eastern Moreton district, in damp areas around habitation.

10. **Cyperus rotundus* L.

NUTGRASS

Perennial with stolons forming blackish ellipsoid tubers; stems rigid, erect, triquetrous,

smooth, 15–40 cm tall, 1–2 mm thick, tuberous at base. Leaves well developed, longer or shorter than inflorescences, 2–6 mm wide. Inflorescences simple or compound, with 3–8 unequal primary rays each up to 10 cm long, involucre bracts 2–4, shorter or longer than inflorescence; spikes ovoid, 2–2.5 cm × 2–3 cm, rachis glabrous; spikelets linear in outline, compressed, acute, 1–2.5 cm × 0.2–0.25 cm, 10–30-flowered, rachilla persistent, broadly winged; glumes 2.8–3.5 mm long, sides deep brown; stamens 3; stigmas 3. Nuts obloid-obovoid, trigonous, rarely maturing. **Fig. 44I.**

Widespread in warmer parts of the world; naturalized in Australia; a common weed in the region.

The species rarely forms mature fruits but is spread by its tubers. Plants send out stolons which quickly form tubers, commonly known as “nuts”, and the species can infest large areas.

11. *Cyperus bifax* C. B. Clarke WESTERN NUTGRASS; DOWNS NUTGRASS

Cyperus retzii auct. non Poiret, Nees

Perennial with slender rhizomes producing blackish ellipsoid tubers; stems rigid, erect, triquetrous, smooth, up to 80 cm tall, 1–3 mm thick, tuberous at base. Leaves well developed, $\frac{1}{2}$ as long to as long as stem, 2–6 mm wide. Inflorescences simple or compound, with 2–8 unequal rays each up to 10 cm long, involucre bracts 2–4, lower longer than inflorescence; spikes ovoid, 2–4 cm × 2–3 cm, rachis glabrous; spikelets linear in outline, compressed, acute, 1–4 cm × 0.2–0.23 cm, 10–30-flowered, rachilla persistent, broadly winged; glumes 3–4 mm long, sides light brown to dark brown, stamens 3; stigmas 3. Nuts greyish brown, obloid-obovoid, trigonous, $\frac{1}{3}$ length of glume.

Fig. 44K.

Widespread in the region, sometimes a weed of cultivation.

12. *Cyperus tuberosus* Rottb.

Perennial with slender rhizomes producing dark brown tubers; stems rigid or somewhat lax, erect to oblique, triquetrous, smooth, 30–70 cm tall, 2–3 mm thick, tuberous at base. Leaves well developed, from $\frac{1}{2}$ as long to longer than stems, 2–5 mm wide. Inflorescences simple or compound, with 2–8 unequal rays up to 10 cm long, involucre bracts 3 or 4, lower longer than inflorescence; spikes ovoid, up to 4 cm × 3.5 cm, rachis glabrous; spikelets oblong or linear-ovate in outline, 0.6–3 cm × 0.2–0.25 cm, 8–18-flowered, rachilla persistent, broadly winged; glumes ca 3.5 mm long, sides pale coloured to rusty brown; stamens 3; stigmas 3. Nuts greyish brown, broadly obovoid, trigonous to nearly circular in cross section, ca $\frac{1}{3}$ length of glume.

Known in the region from the Gympie and Maryborough areas of Wide Bay district.

13. **Cyperus esculentus* L. YELLOW NUTGRASS; YELLOW NUTSEDGE

Perennial with stolons forming 1 cm thick tubers covered in grey tomentum when mature; stems rigid, erect, triquetrous, smooth, 10–40 cm tall, 2–3 mm thick. Leaves longer or shorter than inflorescences, 3–6 mm wide. Inflorescences simple or compound, with 5–10 unequal spreading rays each up to 10 cm long, involucre bracts 3–6, lower longer than inflorescence; spikes ovoid, 1.5–3 cm × 2–2.5 cm, rachis frequently slightly hispid; spikelets linear-oblong in outline, 0.5–1.8 cm × 0.2–0.25 cm, 8–20-flowered, rachilla persistent, broadly winged; glumes 2.5–3 mm long, sides golden yellow to pale brown, margin hyaline; stamens 3; stigmas 3. Nuts greyish brown, obovoid or obloid-obovoid, obtuse, trigonous, ca $\frac{1}{2}$ length of glume. **Fig. 44L.**

Native of Africa and India; naturalized in eastern Moreton and Wide Bay districts, sometimes a weed of cultivation.

14. *Cyperus scariosus* R. Br.

Cyperus corymbosus auct. non Rottb.

Perennial with creeping rhizomes producing tubers; stems rigid, erect, triangular in upper part, smooth, 50–90 cm tall, ca 2 mm thick, tuberous at base. Leaves few, usually not $\frac{1}{2}$ length of stem, or blade absent. Inflorescences often pushed to one side by erect lower bract, simple, consisting of 3–6 unequal rays each up to 2.5 cm long or reduced to a simple cluster of spikes; involucre bracts 1–3, 0.5–5 cm long; spikes broadly ovoid, 1–2

cm \times 1–2 cm; spikelets linear in outline, 1–2 cm \times 0.2–0.25 cm, 12–24-flowered, linear, rachilla persistent, broadly winged; glumes 2.75–3 mm long, sides reddish, margin hyaline; stamens 3; stigmas 3. Nuts brown, ellipsoid, trigonous, acute, $\frac{1}{2}$ – $\frac{2}{3}$ length of glume, not always maturing. **Fig. 44M.**

Known from coastal parts of Moreton and Wide Bay districts, usually in swampy brackish areas.

15. *Cyperus victoriensis* C. B. Clarke

Perennial with slender rhizomes producing tubers at tips; stems rigid, erect, trigonous just below inflorescence, smooth, 30–100 cm tall, tuberous at base. Leaves up to $\frac{1}{2}$ length of stem, 2–4 mm wide. Inflorescences often pushed to one side by lower involucre bract, simple, with 4 or 5, rarely 3–8 unequal rays each up to 5 cm long, involucre bracts 3–5, lower longer than inflorescences, spikes ovoid, 2.5–4 cm \times 1.5–3 cm, of 2–14 divaricate spikelets, rachis glabrous; spikelets linear-ovate in outline, 1.5–3(–4) cm \times ca 0.2 cm, 12–28-flowered, rachilla persistent, broadly winged; glumes 3.5–4 mm long, sides light to dark brown; stamens 3; stigmas 3. Nuts grey to dark brown, narrowly obovoid, trigonous, obtuse, ca $\frac{1}{2}$ length of glume.

Known from few localities in Moreton, Darling Downs and Wide Bay districts, usually on heavy clay soils.

16. *Cyperus eleusinoides* Kunth

FLATSEEDGE

Perennial with short rhizome; stems rigid, erect, triquetrous, smooth, 60–100 cm tall, 3–5 mm thick. Leaves 4–8 mm wide. Inflorescences compound, with 5–7 erect rays each up to 16 cm long; secondary rays 5–7, very short, subtended by small bracts, involucre bracts 4–6, lowest longer than inflorescence; spikes cylindrical, 2–3 cm \times 0.5–0.6 cm, rachis not visible; spikelets dense, erect or suberect, linear-oblong in outline, 0.5–1.2 cm \times 0.15–0.2 cm, 12–20-flowered, rachilla persistent, winged; glumes ca 2.2 mm long, sides pale brownish grey, margin hyaline; stamens 3, anther connective smooth; stigmas 3. Nuts brown, obloid-obovoid, trigonous, ca $\frac{2}{3}$ length of glume. **Fig. 44J.**

Known from non coastal parts of Moreton district, also recorded from Burnett district, often along creek banks.

17. *Cyperus distans* L. f.

Rhizome short, creeping; stems rigid, triquetrous, smooth, 15–90 cm tall, 2–4 mm thick, swollen at base. Leaves 2–7 mm wide. Inflorescences 1 or more times compound, with 4–12 spreading unequal rays each up to 18 cm long, involucre bracts 4–8, lower longer than inflorescence; spikes broadly ovoid, 2–2.5 cm \times up to 3 cm; spikelets linear, 1–2.5 cm \times 0.05–0.1 cm, 6–25-flowered, rachilla persistent, flexuous, broadly winged; glumes 1.5–2 mm long, sides reddish brown, rarely stramineous; stamens 3; stigmas 3. Nuts grey, obloid, trigonous, $\frac{2}{3}$ length of glume. **Fig. 45A.**

Known from a few places in eastern Wide Bay district, usually in damp areas.

18. *Cyperus procerus* Rottb.

Cyperus ornatus R. Br.

Perennial with short rhizome producing stolons; stems stout, rigid, erect, triquetrous, smooth, 0.75–1.5 m tall, 4–7 mm thick. Leaves \pm equal in length to stem, 0.2–1.5 cm wide. Inflorescences simple or compound, with 3–7 unequal rays each up to 15 cm long, involucre bracts 3 or 4, lower very long; spikes broadly ovoid, 2–4 cm \times 2–4 cm; spikelets oblong-linear in outline, 0.5–2.5 cm \times 0.2–0.3 cm, 14–36-flowered, rachilla straight, wingless; glumes ca 3 mm long, sides brown to reddish brown with broad white hyaline margin in upper part; stamens 3; stigmas 3. Nuts dark brown, ellipsoid-obovoid, triquetrous, ca $\frac{1}{2}$ length of glume. **Fig. 45B.**

Known from scattered localities throughout the region.

19. *Cyperus pilosus* Vahl

Perennial with rhizome producing stolons; stems rigid, erect, triquetrous, smooth or slightly scabrous above, 30–100 cm tall, 3–6 mm thick. Leaves 0.3–1.2 cm wide. Inflorescences 1 or more times compound with 4–10 unequal primary rays each up to 10 cm long, secondary rays 3–6, sessile, at right angles to primary rays, or reflexed,



Fig. 44 CYPERACEAE — A–M *Cyperus* spp. — A₁–A₂ *C. digitatus*, A₁ spike x 1, A₂ spikelet x 6; B₁–B₂ *C. papyrus*, B₁ inflorescence x $\frac{1}{17}$, B₂ base of rays x 1; C₁–C₂ *C. exaltatus*, C₁ spike x 1, C₂ spikelet x 6; D₁–D₂ *C. tenuiculmis*, D₁ spike x 1, D₂ spikelet x 4; E. *C. gymnocaulos*, inflorescence x 1, F *C. involucratus*, spike x 1; G₁–G₂ *C. vaginatus*, G₁ inflorescence x $\frac{1}{2}$, G₂ spike x 4; H *C. sphacelatus*, spikelet x 4; I *C. rotundus*, habit of plant x $\frac{1}{2}$; J *C. eleusinoides*, spike x 4; K *C. bifax*, spikelet x 4; L *C. esculentus*, spike x 1; M *C. scariosus*, inflorescence x 1.

involucral bracts 4 or 5, lower longer than inflorescence; spikes ovoid or cylindrical, 2–3 cm \times 1–2 cm, rachis hispid; spikelets elliptic to linear-ovate in outline, 0.5–1.2 cm \times 0.2–0.25 cm, 8–20-flowered, rachilla persistent, scarcely winged; glumes 2 mm long, sides dark brown, margin whitish hyaline; stamens 3; stigmas 3. Nuts brown or dark brown, obovoid or ellipsoid, triquetrous, *ca* $\frac{1}{2}$ length of glume. **Fig. 45C.**

Widespread in Moreton and Wide Bay districts, around creek banks, swamps and other damp places.

20. *Cyperus iria* L.

Annual with fibrous roots; stems rigid, erect, triquetrous, smooth, 5–60 cm tall, 2–3 mm thick. Leaves shorter or longer than inflorescence, 2–5 mm wide. Inflorescences simple or compound, with 3–8 unequal rays each up to 10 cm long, involucral bracts 3–5, longer than inflorescence; spikes obloid-ovoid or narrowly cylindrical, 1–3 cm \times 0.3–1 cm; spikelets oblong-linear in outline, 3–10 mm \times 1.5–2 mm, 6–20-flowered, rachilla wingless; glumes 1.25–1.5 mm long, keel nerved and arched, sides golden to yellow; stamens 3; stigmas 3. Nuts dark brown, obovoid, triquetrous, as long as or longer than glume. **Fig. 45D.**

Eastern Moreton and Wide Bay districts, in disturbed damp areas, a common weed, also known from a few records from western Darling Downs district.

21. **Cyperus compressus* L.

Annual with fibrous roots; stems tufted, slender, erect or spreading, triquetrous, smooth, 5–35 cm tall, 2–3 mm thick. Leaves longer than or shorter than inflorescence, 1.5–3 mm wide. Inflorescences simple, with terminal spike and 3–8 unequal rays each up to 8 cm long, involucral bracts 3–5, lower longer than inflorescence; spikes ovoid, 1.5–3 cm \times 1.5–3 cm; spikelets oblong, rhombic in cross-section, 1–3 cm \times 0.3–0.4 cm, 12–30-flowered, rachilla straight, initially winged; glumes 3–3.8 mm long, sides green to brown; stamens 3; stigmas 3. Nuts shining dark brown, obovoid, triangular, triquetrous, obtuse, $\frac{1}{3}$ – $\frac{1}{2}$ length of glume. **Fig. 46A.**

A pantropical species; naturalized in Australia, widespread weed in the region in damp areas but most common near the coast.

22. *Cyperus platystylis* R. Br.

Perennial with short rhizome; stems tufted or solitary, stout, rigid, erect, triquetrous, smooth, (20–)30–90 cm tall, 2–5 mm thick. Leaves basal, as long as stems, 6–10 mm wide. Inflorescences 1 or more times compound, with up to 12 widely spreading primary rays each up to 10 cm long, secondary rays 1–2 cm long, involucral bracts 5–8, lower much longer than inflorescence; spikes ovoid to subglobose, 2–3 cm \times up to 3 cm; spikelets oblong-ovate in outline, 0.5–1.5 cm \times 0.25–0.3 cm, up to 50-flowered, rachilla straight, wingless; glumes 2–2.5 mm long, sides light brown, margin whitish hyaline; stamens 3; stigmas 3. Nuts dark brown to black with yellow angles, ellipsoid, trigonous, dorsally compressed, *ca* $\frac{2}{3}$ length of glume, angles corky. **Fig. 45E.**

Eastern Moreton district, sometimes in areas subject to periodic inundation.

23. *Cyperus pedunculatus* F. Muell.

Perennial with very short rhizome; stems tufted, stout, erect, markedly triquetrous or winged, smooth, up to 45 cm tall, 2–4 mm thick. Leaves longer than stems, 6–10 mm wide. Inflorescences simple or compound, with 6–12 obliquely spreading unequal rays each up to 12 cm long, involucral bracts 5 or 6, lower very long; spikes ovoid, up to 2 cm \times 2 cm; spikelets oblong or oblong-ovate in outline, 0.5–2 cm \times 0.25–0.3 cm, up to 25-flowered, rachilla straight, wingless; glumes 2.6–3.5 mm long, sides dark brown; stamens 3; stigmas 3. Nuts yellow becoming dark brown, ellipsoid, trigonous, *ca* $\frac{1}{2}$ length of glume. **Fig. 45F.**

Known from rainforest on Fraser I. and adjacent mainland parts of Wide Bay district and also from north-eastern Moreton district.

24. **Cyperus eragrostis* Lam.

UMBRELLA SEDGE

Perennial with short rhizome; stems stout, erect, trigonous, smooth, 30–60 cm tall, 2–4 mm thick. Leaves longer or shorter than inflorescence, 4–8 mm wide. Inflorescences

simple or compound, with terminal spike and 6–12 unequal spreading primary rays each up to 6(–12) cm long, secondary rays at right angles to primary rays up to 2 cm long, involucre bracts 5–8, lower much longer than inflorescence; spikes subglobose, 1.5–2 cm wide; spikelets oblong in outline, subacute, 1–1.5 cm \times 0.25–0.3 cm, up to 26-flowered, rachilla straight, wingless; glumes 2–2.5 mm long, sides light yellow or stramineous; stamen 1; stigmas 3. Nuts shining pearl coloured, obovate, trigonous, strongly apiculate, *ca* $\frac{1}{2}$ length of glume. **Fig. 45G.**

Native of South America; naturalized in Australia, a weed in a few areas in Moreton and Wide Bay districts and south-eastern Darling Downs district, in damp places.

25. *Cyperus trinervis* R. Br.

Perennial with short rhizome; stems tufted, erect, trigonous, smooth, 15–40 cm tall, *ca* 1 mm thick. Leaves shorter than stems, 1–2.5 mm wide. Inflorescences simple, rarely subcompound, with 4–8 unequal rays each up to 8 cm long, involucre bracts 3, rarely 4, lower longer than inflorescence; spikes ovoid to subglobose, 1–2 cm \times 1–3(–4) cm wide; spikelets linear in outline, 0.4–2 cm \times 0.15–0.2 cm, 10–40-flowered, rachilla straight, wingless; glumes *ca* 1.5 mm long, keel and upper half of sides green, lower half of sides pale or light stramineous; stamens 3; stigmas 3. Nuts becoming dark brown, broadly ellipsoid, trigonous, apiculate, *ca* $\frac{2}{3}$ length of glume. **Fig. 45H.**

Widespread in the region, most common in Moreton district, usually in damp places.

26. *Cyperus aquatilis* R. Br.

Annual; stems tufted, weak, erect or oblique, compressed, triquetrous, smooth, 10–30 cm tall, 1–1.5 mm thick. Leaves shorter than inflorescence, 2–3 mm wide. Inflorescences simple or subcompound, with 2–6 unequal rays each up to 10(–15) cm long, involucre bracts 2, usually shorter than inflorescence; spikes broadly ovoid, up to 1 cm \times 2 cm, with 2–14 digitately spreading spikelets; spikelets oblong in outline, obtuse, 5–10 mm \times 2–3 mm, 10–20-flowered, rachilla straight, wingless; glumes 1.5–1.75 mm long, upper half of sides green, lower half of sides hyaline tinged red, cellular-reticulate; stamens 2; stigmas 3. Nuts pale brown, obovoid, triquetrous, *ca* $\frac{1}{2}$ length of glume. **Fig. 45J.**

Widespread in coastal parts of Moreton and Wide Bay districts, in damp places.

27. *Cyperus flaccidus* R. Br.

Annual; stems tufted, weak, erect or curved, compressed, triquetrous, smooth, 5–15(–25) cm, *ca* 1 mm thick. Leaves shorter than inflorescence, 1–1.5 mm wide. Inflorescences simple or compound, with terminal spike and 0–6 unequal primary rays each up to 8 cm long, secondary rays very short, involucre bracts usually 1, longer than inflorescence and often appearing to continue stem; spikes broadly ovoid, up to 1 cm \times 2 cm, with 2–6, rarely 7 or 8 digitately spreading spikelets; spikelets oblong in outline, obtuse, 5–10 mm \times 2–2.5 mm, 16–30-flowered, rachilla straight, wingless; glumes 1–1.2 mm long, upper half of sides pale green, lower half of sides white-hyaline, cellular-reticulate; stamens 1, rarely 2; stigmas 3. Nuts pale brown, obovoid, triquetrous, apex truncate, $\frac{1}{3}$ – $\frac{1}{2}$ length of glume. **Fig. 45I.**

Widespread in the region, usually in damp places.

28. *Cyperus laevis* R. Br.

Perennial with very short rhizome; stems densely tufted, weak, oblique, triquetrous, smooth, 10–35 cm tall, *ca* 1 mm thick. Leaves shorter than stem, up to 2 mm wide. Inflorescences simple, usually with solitary terminal spike but occasionally with few unequal rays each up to 3 cm long, involucre bracts 2, lower appearing to continue stem, hairy at base; spikes ovoid, up to 1.5 cm \times 1.5 cm; spikelets linear-oblong in outline, 0.5–1.5 cm \times 0.15–0.2 cm, 10–30-flowered, rachilla straight, wingless; glumes 1.5–2 mm long, sides frequently with reddish patch near margin; stamens 3; stigmas 3. Nuts dark brown, slightly obovoid, triquetrous, $\frac{1}{2}$ – $\frac{2}{3}$ length of glume. **Fig. 45K.**

Widespread in Moreton and Wide Bay districts and also known from extreme eastern Darling Downs district, mostly in damp shady areas.

29. *Cyperus mirus* C. B. Clarke*Cyperus debilis* auct. non R. Br., F. M. Bailey

Perennial with short rhizome; stems densely tufted, filiform, erect or oblique, 4-angled, smooth, 10–30 cm tall, *ca* 0.4 mm thick. Leaves shorter than inflorescence. Inflorescences simple terminal spikes, involucre bracts 3 or 4, rarely 2; spikes ovoid, up to 1.5 cm × 1.5 cm; spikelets oblong-linear in outline, subacute, up to 8 mm × 1.5–1.8 mm, 6–12-flowered, rachilla straight, wingless; glumes 1.8–2 mm long, sides whitish; stamens 3; stigmas 3. Nuts becoming black, broadly ellipsoid, trigonous, *ca* $\frac{2}{3}$ length of glume, longitudinally striate. **Fig. 45N.**

Widespread in the region, often at altitudes up to 700 m.

30. *Cyperus enervis* R. Br.*Cyperus debilis* R. Br.; *C. enervis* var. *fallax* Domin

Perennial with short rhizome; stems densely tufted, slender, erect or oblique, 4-angled, smooth, 10–30 cm tall, up to 0.8 mm thick. Leaves filiform, shorter than inflorescence. Inflorescences simple terminal spikes, involucre bracts 3 or 4, lower very long; spikes ovoid, up to 2.5 cm × 2.5 cm; spikelets oblong-linear in outline, acute, 0.5–1.5 cm × *ca* 0.2 cm, up to 32-flowered, rachilla straight, wingless; glumes 1.8–2 mm long, sides whitish; stamens 3; stigmas 3. Nuts pale brown, trigonous, ellipsoid or slightly obovoid, $\frac{2}{3}$ length of glume. **Fig. 45O.**

Moreton district, common, also known from Wide Bay and Burnett districts, in damp areas.

31. *Cyperus curvistylis* Kern

Perennial with short rhizome; stems tufted, slender, erect, trigonous, grooved, smooth, up to 35 cm tall, *ca* 0.3 mm thick. Leaves shorter than stem, *ca* 0.5 mm wide. Inflorescences terminal spikes, involucre bracts 2 or 3, lower much longer than inflorescence; spikes ovoid, up to 1 cm × 1 cm, with 2–5 digitately spreading spikelets; spikelets linear-oblong in outline, subacute, to up to 10 mm × 1.5–2 mm, 8–20-flowered, narrowly winged; glumes 1.5 mm long, sides pale green; stamens 3; stigmas 3 with style base persistent, strongly recurved for *ca* 0.35 mm. Nuts brown, ellipsoid, triquetrous, *ca* $\frac{2}{3}$ length of glume.

Known from Burnett district in brigalow communities.

32. *Cyperus gracilis* R. Br.**SLENDER SEDGE; WHISKER GRASS**

Perennial with short rhizome; stems tufted, slender, 4-angled, smooth, 5–30 cm tall, up to 0.5 mm thick. Leaves shorter than stem, 0.5–1.5 mm wide. Inflorescences terminal spike, involucre bracts 3 or 4, much longer than inflorescence; spikes ovoid to subglobular, up to 2.5 cm × 2.5 cm, with 2–9 digitately spreading spikelets; spikelets linear-oblong in outline, subacute, 5–10 mm × 2–3 mm, 8–30-flowered, rachilla straight, wingless; glumes 2–2.5 mm long, sides pale green to yellow; stamens 3; stigmas 3. Nuts brown to dark brown, obovoid, trigonous, distinctly truncate at apex, *ca* $\frac{2}{3}$ length of glume. **Fig. 45P.**

Widespread throughout the region, in damp places; common.

33. *Cyperus sculptus* S. T. Blake

Perennial with very short rhizome; stems densely tufted, slender, erect or oblique, angled, smooth, 5–25 cm tall, 0.3–0.5 mm thick. Leaves shorter than stem, 0.6–0.8 mm wide. Inflorescences terminal spike, involucre bracts 3, rarely 2, 2 much longer than inflorescence; spikes ovoid, up to 2 cm × 2 cm, with 1–8 digitately spreading spikelets; spikelets linear-oblong in outline, obtuse, 7–10 mm × 1.8–2.2 mm, 12–30-flowered, wingless; glumes 1.6–1.9 mm long, sides pale green to yellow; stamens 3; stigmas 3. Nuts shining brown, broadly ellipsoid, trigonous, *ca* $\frac{1}{2}$ length of glume, coarsely reticulate. **Fig. 45Q.**

Widespread throughout the region, often a weed in damp places.

34. *Cyperus stradbrokeensis* Domin

Perennial with very short rhizome; stems tufted, slender, erect or oblique, trigonous, striate, smooth, 20–40 cm tall, *ca* 1.5 mm thick. Leaves shorter than or as long as stem,



Fig. 45 CYPERACEAE — A–Q *Cyperus* spp. — A *C. distans*, spikelet with deciduous glumes x 4; B *C. procerus*, spikelet x 4; C₁–C₂ *C. pilosus*, C₁ part of inflorescence x $\frac{2}{3}$, C₂ rachis showing hairs x 17; D₁–D₂ *C. iria*, D₁ spike x 4, D₂ spikelet x 8; E *C. platystylis*, spike x $\frac{2}{3}$; F₁–F₂ *C. pedunculatus*, F₁ part of inflorescence x $\frac{2}{3}$, F₂ spikelet x 4; G *C. eragrostis*, spikelet x 4; H *C. trinervis*, spikelet x 4; I *C. flaccidus*, inflorescence x $\frac{2}{3}$; J *C. aquatilis*, inflorescence x $\frac{2}{3}$; K *C. laevis*, inflorescence x $\frac{2}{3}$; L₁–L₃ *C. haspan*, L₁ inflorescence x $\frac{2}{3}$, L₂ spikelet x 4, L₃ nut x 17; M₁–M₃ *C. stradbrokeensis*, M₁ inflorescence x $\frac{2}{3}$, M₂ spikelet x 4, M₃ nut and T.S. of nut x 11; N₁–N₂ *C. mirus*, N₁ spikelet x 6, N₂ nut and T.S. of nut x 17; O₁–O₂ *C. enervis*, O₁ spikelet x 8, O₂ nut and T.S. of nut x 17; P₁–P₂ *C. gracilis*, P₁ spikelet x 4, P₂ nut and T.S. of nut x 17; Q₁–Q₂ *C. sculptus*, Q₁ spikelet x 4, Q₂ nut and T.S. of nut x 17.

1.5–2 mm wide. Inflorescences simple, with single terminal spike and 0–3 very short unequal rays mostly 1–3 cm long, involucre bracts 3, lower 2 much longer than inflorescence; spikes ovoid, up to 1.5 cm \times 1.5 cm but mostly smaller; spikelets linear in outline, 4–7 mm \times ca 2 mm, 9–14-flowered, rachilla straight, wingless; glumes 1.25 mm long, sides pale brown, red glandular-dotted; stamens 2; stigmas 3. Nuts dark brown, ellipsoid or slightly obovoid, triquetrous, ca as long as glume. **Fig. 45M.**

Known from Moreton and Wide Bay districts, in sandy coastal areas.

35. *Cyperus tenellus* L. f.

TINY FLATSEEDGE

Annual with fibrous roots; stems tufted, weak, curved or erect, triquetrous, 2–10 cm tall, ca 0.3 mm wide. Leaves shorter than stem, up to 0.5 mm wide. Inflorescences appearing pseudolateral; with 1–3, rarely 4 digitately spreading spikelets, involucre bracts 1 or 2, lower appearing as continuation of stem, shorter or longer than inflorescence; spikelets oblong in outline, 4–7 mm \times ca 2 mm, 6–18-flowered, rachilla flexuous, wingless; glumes 1.5–1.7 mm long, sides stained brown; stamens 1–3; stigmas 3. Nuts brown, ellipsoid with concave sides, triquetrous, $\frac{1}{2}$ – $\frac{2}{3}$ length of glume.

Collected once from Mt Tamborine in southern Moreton district.

36. *Cyperus haspan* L.

Perennial with short rhizome, often flowering in first year; stems tufted or solitary, weak, erect, markedly triquetrous, smooth, 10–40 cm tall, 0.75–1.5 mm thick. Leaves flat or reduced to sheathing bracts, shorter than stem, 2–3 mm wide. Inflorescences 1 or more times compound, with 3–12, rarely up to 15 unequal primary rays each up to 6 cm long, secondary rays very short, involucre bracts 2 or 3, usually shorter than inflorescence; spikes ovoid, up to 2.5 cm \times 2.5 cm; spikelets linear in outline, acute, 5–10 mm \times 1–1.5 mm, 10–30-flowered, rachilla straight, wingless; glumes 1–1.5 mm long, sides pale yellow to reddish; stamen 1; stigmas 3. Nuts whitish becoming yellow, obovoid, trigonous, ca $\frac{1}{3}$ length of glume. **Fig. 45L.**

Widespread in Moreton district, common, also known from Darling Downs and Wide Bay districts.

37. *Cyperus concinnus* R. Br.

Cyperus concinnus var. *parvifructus* Kükenenthal

Perennial; stems slender, rigid, erect, trigonous, scabrous in upper half, 25–50 cm tall, 1–1.5 mm thick. Leaves \pm equal to stem, 1–2 mm wide. Inflorescences 1 or more times compound, with numerous slender primary rays each up to 3 cm long, secondary rays up to 1 cm long, involucre bracts 3, rarely 4, lower longer than inflorescence; spikes ovoid, up to 1 cm \times 1 cm; spikelets ovoid to narrowly ovoid in outline, 4–6 mm \times 2–2.5 mm, up to 24-flowered, rachilla straight, wingless; glumes ca 1.5 mm long, sides usually rich brown, tips and margins pale, hyaline; stamens 3; stigmas 3. Nuts yellowish green, ellipsoid, triquetrous, $\frac{1}{3}$ – $\frac{1}{2}$ length of glume. **Fig. 46B.**

Widespread in Moreton, Darling Downs and Wide Bay districts; not common.

38. **Cyperus prolifer* Lam.

DWARF POPYRUS

Cyperus isocladius Kunth

Perennial, shortly rhizomatous; stems tufted, stout, erect, rigid, terete becoming trigonous below inflorescence, smooth, 30–60 cm tall, 3–4 mm thick. Leaves reduced to sheathing bracts. Inflorescences simple or compound, with 50–100 widely spreading subequal primary rays up to 12 cm long, secondary rays 1–2 cm long; involucre bracts 2 or 3, much shorter than inflorescence; spikes ovoid, up to 2 cm \times 2 cm; spikelets linear in outline, 0.6–1.2 cm \times 0.5–0.1 cm, 8–24-flowered, rachilla straight, wingless; glumes 1.5 mm long; stamens 3; stigmas 3. Nuts white, obovoid, trigonous, ca $\frac{1}{4}$ length of glume. **Fig. 46C.**

Native of southern Africa; cultivated as an ornamental, escaped from cultivation in few places in Moreton district.

39. *Cyperus difformis* L.

RICE SEDGE

Annual; stems tufted, rather weak, erect, triquetrous, compressible, smooth, 20–50 cm tall, 2–3 mm thick. Leaves shorter than or equal to stem, flat, 2–4 mm wide.

Inflorescences simple or subcompound, of 5–9 unequal spreading rays each up to 3 cm long; involucre bracts 2 or 3, lower much longer than inflorescence; spikes globose, up to 1 cm × 1(–1.75) cm; spikelets linear, obtuse, 4–8 mm × 1–1.25 mm, 10–40-flowered, rachilla straight, wingless; glumes 0.6–0.9 mm long, sides rich brown with tips and margins becoming pale hyaline; stamens 1 or 2; stigmas 3. Nuts greenish yellow, ellipsoid, triquetrous, *ca* as long as glume. **Fig. 46D.**

Very widespread in the region, in damp places; moderately common.

40. *Cyperus cuspidatus* Kunth

Annual; stems tufted, erect or curved, trigonous, smooth, 2–15 cm tall, *ca* 1 mm thick. Leaves few, as long as or shorter than stem. Inflorescences simple, with terminal head and 0–3 unequal rays each up to 3 cm long, involucre bracts 3 or 4, lower longer than inflorescence; spikes ovoid or globose, up to 2 cm × 2 cm; spikelets linear in outline, 0.5–1.5 cm × 0.2–0.3 cm, up to 40-flowered, rachilla straight, wingless; glumes 1.5–2 mm long including mucro, sides brown to castaneus; stamens 2 or 3; stigmas 3. Nuts dark brown, obloid-obovoid, trigonous, $\frac{1}{3}$ – $\frac{1}{2}$ length of glume. **Fig. 46E.**

Widespread in Moreton, Wide Bay and Burnett districts, often in sandy areas; not common.

41. *Cyperus castaneus* Willd.

Annual; stems tufted, slender, erect or oblique, trigonous, smooth, 2–10 cm tall, up to 2 mm thick. Leaves shorter than inflorescence, up to 0.5 mm wide. Inflorescences simple, with terminal spike and 0–3 unequal rays each up to 3 cm long, involucre bracts 3–5, not much longer than inflorescence; spikes ovoid, up to 2.5 cm × 2.5 cm; spikelets linear in outline, subacute, 0.5–2 cm × 0.1–0.15 cm, 12–40-flowered, rachilla straight, wingless; glumes 1.5–1.8 mm long, sides usually rich reddish brown; stamen 1; stigmas 3. Nuts dark brown, obloid, trigonous, *ca* $\frac{2}{3}$ length of glume. **Fig. 46F.**

Darling Downs and Burnett districts; rare in region.

42. *Cyperus squarrosus* L.

BEARDED FLATSEDE

Annual; stems tufted, erect, triquetrous, smooth, 5–10(–15) cm tall, *ca* 1–2 mm thick. Leaves flat, 1–2.5 mm wide. Inflorescences simple, with 2–5 rays or contracted into solitary spike, involucre bracts 2–4, lower longer than inflorescence; spike globose to obloid-ovoid, 0.5–1.5(–2) cm × 0.5–1.5(–2) cm; spikelets narrowly oblong in outline, 4–7 mm × *ca* 3 mm including awns, 6–12-flowered, rachilla wingless; glumes 2.5–3.4 mm long including 1–2 mm long recurved awn, sides ferruginous to reddish; stamen 1; stigmas 3. Nuts greyish brown, obloid-obovoid, trigonous, *ca* $\frac{1}{3}$ length of glume. **Fig. 46H.**

Widespread in the region, often in damp places; not common.

43. *Cyperus pulchellus* R. Br.

Perennial with short rhizome; stems tufted, slender, erect, triquetrous, smooth, 10–20 cm tall, 0.5–1 mm thick. Leaves few, short, 1–1.5 mm wide. Inflorescences solitary whitish globose head, *ca* 1 cm × *ca* 1 cm, involucre bracts 3 or 4, 2 much longer than inflorescence, becoming reflexed; spikelets ovate in outline, 3–5 mm × 1.5–2 mm, 10–20-flowered, rachilla straight, wingless; glumes 1.2–1.5 mm long, sides whitish with fine red lines; stamens 1, rarely 2; stigma 3. Nuts brown, obloid, trigonous, $\frac{1}{2}$ length of glume.

Known from the Chinchilla-Barakula area of north-western Darling Downs district.

44. *Cyperus javanicus* Hoult.

Cyperus pennatus Lam.

Perennial with short rhizome; stems tufted, rigid, erect, obtusely trigonous, smooth, densely papillose, 40–100 cm tall, 1–2 mm thick. Leaves long, folded at base, flat above, 2–8 mm wide, septate-nodulose. Inflorescences 1 or more times compound, with 6–12 primary rays each up to 8 cm long, secondary rays short, involucre bracts 4–6, much longer than inflorescence; spikes broadly cylindrical, 1.5–2 cm × 1–1.5 cm; spikelets oblong-ovate in outline, acute, 5–10 mm × 2–2.5 mm, 6–10-flowered, falling off as a

whole, rachilla broadly winged; glumes 2.5–3.5 mm long, sides brown striped; stamens 3; stigmas 3. Nuts dark brown to black, ellipsoid-obovoid, trigonous, 1.2–1.5 mm long. **Fig. 46L.**

Known from eastern Moreton and Wide Bay district, in damp often sandy areas.

45. *Cyperus tetracarpus* Boeck.

Perennial with short rhizome; stems tufted, rigid, erect, minutely papillose, 25–60 cm tall. Leaves as long as or longer than stems, 2–3 mm wide. Inflorescences simple or subcompound, with 5–10 rays each up to 5 cm long, involucre bracts 4 or 5, lower much longer than inflorescence; spikes cylindrical, 1–1.5(–2) cm \times 0.6–1 cm, sometimes with 1 or 2, reflexed lateral spikes at base; spikelets ovoid, acute, *ca* 4 mm \times *ca* 1.5 mm, 3- or 4-flowered, rachilla broadly winged, falling off as a whole; glumes *ca* 2 mm long, not keeled, sides brown striped; stamens 3; stigmas 3. Nuts dark brown, ellipsoid, trigonous, $\frac{1}{2}$ length of glume.

Collected once on Mud I. in Moreton Bay in Moreton district.

46. *Cyperus pygmaeus* Rottb.

DWARF SEDGE

Annual; stems tufted, firm, triquetrous, smooth, 1–15(–25) cm tall, *ca* 1 mm thick. Leaves with blades *ca* as long as stem, 1–2 mm wide. Inflorescences of several dense glomerules forming tight pyramidal or globose head, 0.5–1(–1.5) cm \times 0.5–1(–1.5) cm, involucre bracts 5–7, broad at base, several small inner bracteoles protruding from inflorescence; spikelets ovate to narrowly ovate in outline, 3–5 mm \times 1.5–2 mm, 10–20-flowered, rachilla somewhat flexuose, wingless; glumes 1–2 mm long, sides green becoming stramineous; stamens 1 or 2; stigmas 2, occasionally 3. Nuts pale brown, ellipsoid, plano convex or trigonous, $\frac{1}{3}$ – $\frac{1}{2}$ length of glume. **Fig. 46P.**

Known from the vicinity of Chinchilla in Darling Downs district.

47. *Cyperus lucidus* R. Br.

Perennial with woody rhizome; stems stout, rigid, erect, triquetrous, smooth, thickened at base, 0.4–2 m tall, 3–8 mm thick. Leaves folded, becoming flat above, frequently much longer than stem, 5–10 mm wide. Inflorescences 1 or more times compound, with 6–10 unequal primary rays each up to 20(–30) cm long, secondary rays up to 2 cm long, involucre bracts 5–7, lowest up to 1 m long; spikes cylindrical or ovoid-cylindrical, 3–5 cm \times 2–3 cm; spikelets linear in outline, acute, 0.8–1.6 cm \times 0.15–0.2 cm, 4–8-flowered, falling off as a whole, rachilla narrowly winged; glumes 4–5 mm long, sides pale brown to reddish brown, margin white hyaline; stamens 3; stigmas 3. Nuts brown, trigonous, obloid-narrowly cylindrical, 2.2–2.7 mm long. **Fig. 46L.**

Widespread in Moreton and Wide Bay districts, often on creek banks and around swamps, also known from western Darling Downs district.

48. **Cyperus albostratus* Schrad.

Perennial with long creeping rhizome; stems rigid, erect, trigonous, smooth, 15–50 cm tall. Leaves flat, as long as stem or shorter, 0.8–1.5 cm wide. Inflorescences 1 or more times compound, with 12–20 primary rays each up to 14 cm long, secondary rays 2–4 cm long, involucre bracts 6–9, subequal, *ca* as long as inflorescence; spikes with 1–3 digitate spreading spikelets; spikelets linear in outline, acute, 0.4–1.4 cm \times *ca* 0.15 cm, 8–32-flowered, rachilla straight, winged; glumes *ca* 1.5 mm long, sides stramineous or ferruginous; stamens 3; stigmas 3. Nuts becoming black, obloid-ellipsoid, trigonous, apiculate, nearly as long as glume. **Fig. 46O.**

Native of Africa; cultivated as an ornamental, sometimes found as a garden escape.

49. *Cyperus filipes* Benth.

Perennial with creeping rhizome; stems distant, rigid, erect, triquetrous, smooth, 30–90 cm tall, 2–3 mm thick. Leaves reduced to sheathing bracts or with very short blades. Inflorescences simple or compound, with 4–8 filiform primary rays each 10–20 cm long, involucre bracts 8, rarely 9, subequal, 20–26 cm long; spikes consisting of 1–5 digitately spreading spikelets; spikelets linear in outline, 0.5–1.2 cm \times 0.1–0.15 cm, 16–36-



Fig. 46 CYPERACEAE — A–P *Cyperus* spp. — A *C. compressus*, spikelet x 4; B *C. concinnus*, spikelet x 6; C₁–C₂ *C. prolifer*, C₁ spike x 1, C₂ spikelet x 6; D *C. difformis*, spikelet x 6; E *C. cuspidatus*, spikelet x 6; F₁–F₂ *C. castaneus*, F₁ spike x 1, F₂ spikelet x 6; G *C. disjunctus*, spikelet x 6; H₁–H₂ *C. squarrosus*, H₁ spike x 1, H₂ spikelet x 6; I *C. javanicus*, spikelet x 6; J *C. semifertilis*, spikelet x 6; K₁–K₂ *C. tetraphyllus*, K₁ spikelet x 6, K₂ part of spikelet x 12; L *C. lucidus*, spikelet x 6; M *C. subulatus*, spikelet x 6; N₁–N₂ *C. rupicola*, N₁ inflorescence x 1, N₂ spikelet x 6; O *C. albostratus*, spikelet x 6; P *C. pygmaeus*, inflorescence x 1½.

flowered, rachilla straight, wingless; glumes 1–1.25 mm long, scarcely keeled, sides dark brown, lower 4 glumes empty and smaller; stamens 3; stigmas 3. Nuts yellow, ellipsoid, trigonous, as long as glume.

Collected once from near Wallangarra in south-eastern Darling Downs district.

50. *Cyperus disjunctus* C. B. Clarke

Perennial with creeping rhizome; stems loosely tufted or distant, rigid, triquetrous, smooth, 30–60 cm tall, *ca* 2 mm thick. Leaves flat, as long as stem, up to 6 mm wide. Inflorescences simple or compound, with 1 or 2 somewhat distant ovoid heads, 0.6–2 cm \times 0.6–2 cm, each head with several very short rays and occasional longer rays up to 3 cm long, involucre bracts 2 or 3, rarely 4, foliaceous, much longer than inflorescence; spikes of 4–12 densely congested digitate spikelets; spikelets oblong-linear in outline, subacute, 5–6 mm \times 1.5–2 mm, 6–14-flowered, rachilla straight, wingless; glumes 1.25–1.5 mm long, sides reddish brown; stamens 3; stigmas 3. Nuts dark grey, ellipsoid, trigonous, \pm as long as glume. **Fig. 46G.**

Known from mountainous regions of Moreton district close to the border with New South Wales.

51. *Cyperus semifertilis* S. T. Blake

Perennial with horizontally creeping rhizome; stems slender, erect, triquetrous, scabrous, 30–55 cm tall, *ca* 1 mm thick. Leaves longer than stem, flat or revolute, 1.5–4 mm wide. Inflorescences simple, with 1–3 unequal rays each up to 5 cm long or rarely reduced to single spike, involucre bracts 2 or 3, lower longer than inflorescences; spikes ovoid with 1–6 digitate spreading spikelets; spikelets linear in outline, acuminate, 0.6–1.4(–2) cm \times 0.12–0.25 cm, rachilla straight, wingless; glumes 1.6–1.7 mm long, lower glumes green, upper pale brown; stamens 3; stigmas 3. Nuts brown, ellipsoid, trigonous, sides flat or convex, somewhat longer than glume. **Fig. 46J.**

Known only from Mt Glorious, Mt Tamborine and Springbrook in Moreton District.

52. *Cyperus tetraphyllus* R. Br.

Perennial with short rhizome; stems tufted, rigid, erect, triquetrous, smooth, 15–60 cm long, 1–2 mm thick. Leaves basal, flat, as long as or shorter than stem, 3–7 mm wide. Inflorescences simple, occasionally subcompound, with 4–10 suberect unequal rays each up to 6 cm long, involucre bracts 4–6, lower much longer than inflorescence; spikes ovoid, up to 2 cm \times 3 cm; spikelets linear in outline, acute, 0.5–2 cm \times 0.15–0.2 cm, up to 30-flowered, rachilla straight, wingless, glumes 1.5–2 mm long, sides very dark brown; stamens 3; stigmas 3. Nuts yellowish white, ellipsoid, triquetrous, sides concave, as long as glume, wider than glume when mature. **Fig. 46K.**

Widespread in the region, mostly in rainforest.

53. *Cyperus rupicola* S. T. Blake

Perennial, rhizomatous; stems stout, erect, triquetrous, smooth, 60–100 cm tall, 2.5–4.5 mm thick. Leaves many, longer than inflorescence, 6–9 mm wide. Inflorescences 2 or more times compound, with 6–8 primary rays each up to 8 cm long, secondary rays much shorter, involucre bracts 6–8, subequal, up to 45 cm long; spikes ovoid, up to 1 cm \times 1 cm, with 2 or 3, digitate spreading spikelets; spikelets oblong-linear in outline, obtuse, 7–10 mm \times 2.5–3.5 mm, 7–12-flowered, rachilla straight, wingless; glumes 3–3.4 mm long, sides brown; stamens 3; stigmas 3. Nuts dark brown, ovoid-ellipsoid, triquetrous, *ca* $\frac{3}{4}$ length of glume. **Fig. 46N.**

Mountainous areas of Moreton district, close to the border with New South Wales.

54. *Cyperus subulatus* R. Br.

Perennial with creeping rhizome; stems erect, rigid, triquetrous, smooth, thickened at base, 20–60 cm tall, 1–1.5 mm thick. Leaves shorter than or as long as stem, 1–2 mm wide. Inflorescences simple, with terminal spike and 2–6 unequal rays each up to 8 cm long, involucre bracts 3 or 4, lower longer than inflorescence; spikes broadly ovoid, up to 2.5 cm \times 4 cm; spikelets linear in outline, acute, 1–3(–5) cm \times 0.1–0.12 cm, 8–24-flowered, rachilla straight, hyaline, winged; glumes 3–3.5 mm long, sides reddish brown;

stamens 3; stigmas 3. Nuts brown, obloid to obloid-obovoid, triquetrous, *ca* $\frac{3}{5}$ length of glume. **Fig. 46M.**

Moreton and Wide Bay districts, in sandy areas close to the coast.

55. *Cyperus dietrichiae* Boeck.

Perennial; stems tufted, rigid, erect, triquetrous, smooth, 40–70 cm tall, 2–4 mm thick. Leaves flat, 2–7 mm wide. Inflorescences simple or compound, with 5–10 primary rays each up to 20(–30) cm long, involucre bracts 2–8, shorter than to longer than inflorescence, up to 1.2 cm wide; spikes broadly ovoid to obloid-cylindrical, 1–1.5 cm \times 1–3(–4) cm; spikelets 1–3 cm \times 0.05 cm, 4–12-flowered, rachilla broadly winged, falling off as a whole; glumes 3–3.5 mm long, sides reddish; stamens 3; stigmas 3. Nuts greenish yellow, narrowly obloid, trigonous, *ca* $\frac{3}{4}$ length of glume.

Two varieties occur in the region:

- | | |
|--|---|
| 1. Involucre bracts 2, rarely 3, shorter than to slightly longer than inflorescence; spikelets 1–1.5 cm long | <i>C. dietrichiae</i> var. <i>brevibracteatus</i> |
| Involucre bracts 4–8, lower much longer than inflorescence; spikelets 1–3 cm long | <i>C. dietrichiae</i> var. <i>dietrichiae</i> |

Cyperus dietrichiae var. *brevibracteatus* (Domin) Kükenthal (*Mariscus dietrichiae* (Boeck.) C. B. Clarke subsp. *brevibracteatus* Domin) is widespread in the region, usually in non coastal areas. *C. dietrichiae* var. *dietrichiae* is found in open woodland and rainforest margins in Moreton and Wide Bay districts.

56. *Cyperus bowmannii* F. Muell. ex Benth.

Perennial; stems tufted, lax, erect or oblique, triquetrous, smooth, 10–45 cm tall, *ca* 1 mm thick. Leaves flat, 1–2 mm wide. Inflorescences simple, with 1–6 unequal rays each up to 5 cm long or inflorescence reduced to single central sessile spike, involucre bracts 3 or 4, lower much longer than inflorescence; spikes obloid-ovoid, 1–2 cm \times 1.5–3 cm; spikelets linear in outline, 1–2 cm \times *ca* 0.08 cm, 4–10-flowered, rachilla very flexuous, broadly winged, falling off as whole; glumes 3 mm long, sides brown; stamens 3; stigmas 3. Nuts brown, narrowly obloid, trigonous, *ca* $\frac{2}{3}$ length of glume, tightly held by wings of rachilla. **Fig. 47A.**

Widespread in Moreton, Wide Bay and Darling Downs districts.

57. *Cyperus scaber* (R. Br.) Boeck.

Mariscus scaber R. Br.

Perennial with shortly creeping rhizome; stems rigid, erect, triquetrous, scabrous, swollen at base, 30–60 cm tall, 1.5–2.5 mm thick. Leaves flat, 4–8 mm wide. Inflorescences compound, with 6–10 rays each up to 11 cm long, involucre bracts 6–10, lower much longer than inflorescence; spikes 1–4 per ray, cylindrical or ovoid, 0.5–2 cm \times 0.5–2 cm, rachis scabrid; spikelets subterete in outline, 3–10 mm \times *ca* 0.7 mm, 1–4-flowered, rachilla flexuous, broadly winged; glumes 2.5–3.5 mm long, sides golden yellow to pale brown; stamens 3; stigmas 3. Nuts brownish, narrowly obloid, trigonous, *ca* $\frac{3}{4}$ length of glume. **Fig. 47D.**

Sandy soils of coastal parts of the region.

58. *Cyperus leiocaulon* Benth.

Perennial but flowering first year; stems rigid, erect or oblique, triquetrous, smooth, swollen at base, 20–35 cm tall, 1–2 mm thick. Leaves flat, 2–3 mm wide. Inflorescences simple, with 4–6 rays each up to 4 cm long; spikes ovoid or obloid-ovoid, 1–1.4 cm \times 1–1.6 cm, involucre bracts 4–6, lower longer than inflorescence; spikelets linear-terete, 5–8 mm \times 0.5–0.8 mm, 2- or 3-flowered, rachilla flexuose, broadly winged; glumes 2.5–3 mm long, sides yellowish to brown; stamens 3; stigmas 3. Nuts dark brown, narrowly obloid, trigonous, *ca* $\frac{3}{4}$ length of glume, tightly held by wings of rachilla. **Fig. 47C.**

Widespread in the region.

59. *Cyperus cyperoides* (L.) Kuntze*Scirpus cyperoides* L.; *Cyperus umbellatus* Benth.

Perennial with woody rhizome; stems rigid, erect, triquetrous, smooth, swollen at base, 20–70 cm tall, 1–2 mm thick. Leaves flat, 3–6 mm wide. Inflorescences simple, consisting of 5–14 rays each up to 6 cm long, involucre bracts 5–10, lower much longer than inflorescence; spikes solitary, cylindrical to ovoid, obtuse, 1.5–4 cm \times 0.6–1 cm; spikelets linear-terete, 2.5–5 mm \times 0.5–1 mm, usually 1-flowered, rachilla broadly winged, clasping nut; flowering glumes usually as long as spikelet, occasionally a second flowering glume present, sides stramineous; stamens 3; stigmas 3. Nuts reddish to brownish, narrowly obloid, trigonous, *ca* $\frac{2}{3}$ length of nut. **Fig. 47E.**

Widespread in eastern Moreton and Wide Bay districts, often in open forest.

60. **Cyperus flavus* (Vahl) Nees*Mariscus flavus* Vahl.

Perennial with creeping rhizome; stems tufted, rigid, erect or oblique, triquetrous, smooth, swollen at base, 10–35 cm tall, *ca* 1 mm thick. Leaves flat, 3–6 mm wide. Inflorescences simple, with 1–4, rarely 8 contracted sessile spikes, involucre bracts 4–6, most longer than inflorescence; spikes obloid-cylindrical, spreading, 1–2 cm \times 0.4–1 cm; spikelets obloid-ovoid, *ca* 4 mm \times *ca* 1.5 mm, 1–3-flowered; glumes *ca* 2.5 mm long, sides green to yellowish; stamens 3; stigmas 3. Nuts dark brown, obovoid, trigonous, sides concave, *ca* $\frac{2}{3}$ length of glume. **Fig. 47M.**

Native of tropical America; naturalized in the region in Moreton, Darling Downs and Wide Bay districts, often a weed in gardens and disturbed areas.

61. *Cyperus betchei* (Kükenthal) S. T. Blake*Cyperus angustatus* R. Br. var. *betchei* Kükenthal

Perennial with very short rhizome; stems densely tufted, erect, rigid, obtusely trigonous, smooth, 40–60 cm tall, 2–3 mm thick. Leaves shorter than stem, 2–4 mm wide. Inflorescences compound, open, with terminal spike and 3–10 unequal spreading primary rays each up to 12 cm long, involucre bracts 3–5, lower much longer than inflorescence; spikes broadly ovoid, up to 5 cm \times 5 cm; spikelets linear-terete, acute, 1–5 cm \times 0.1–0.12 cm, up to 50-flowered, rachilla broadly winged; glumes 2.4–3 mm long, sides yellowish to brown; stamens 3; stigmas 3. Nuts brown, narrowly obloid, trigonous, nearly as long as glume. **Fig. 47H.**

Widespread in Darling Downs district and Burnett districts, usually in damp areas.

62. *Cyperus perangustus* (Kükenthal) S. T. Blake*Cyperus fulvus* R. Br. var. *perangustus* Kükenthal

Perennial with very short rhizome; stems densely tufted, rigid, erect, triquetrous, smooth, 20–50 cm, 1–1.5 mm thick. Leaves with well developed blades as long as or longer than stems, septate-nodulose, 3.5–5.5 mm wide. Inflorescences compound, open, with terminal spike and 7–10 spreading unequal primary rays each up to 10 cm long, secondary rays short and deflexed, involucre bracts 4–6, lower much longer than inflorescence; spikes broadly ovoid, up to 3 cm \times 3 cm; spikelets linear-terete, 0.7–1.8 cm \times 0.12–0.17 cm, 7–22-flowered, rachilla slightly flexuous, broadly winged; glumes 1.8–2.1 mm long, sides yellowish to tawny; stamens 3; stigmas 3. Nuts brown, narrowly ellipsoid, obtusely trigonous, nearly as long as glume. **Fig. 47G.**

Forest areas in eastern Wide Bay district.

63. *Cyperus rigidellus* (Benth.) J. M. Black*Cyperus gracilis* R. Br. var. *rigidellus* Benth.; *C. subpinnatus* Kükenthal

Perennial; stems tufted, rigid, erect, trigonous, somewhat scabrous, 15–35 cm tall, *ca* 1 mm thick. Leaves flat or folded, 2–3 mm wide. Inflorescences simple or compound, with 5–7 rays each up to 6 cm long, involucre bracts 3–5, lower longer than inflorescence; spikes hemispherical or globose, 1–3 cm wide; spikelets obloid to narrowly obloid, 0.8–2 cm \times *ca* 0.2 cm, 10–26-flowered, rachilla broadly winged; glumes 2.8–3.3 mm long, sides



Fig. 47 CYPERACEAE — A–N *Cyperus* spp. — A₁–A₂ *C. bowmanii*, A₁ inflorescence x 1, A₂ spikelet x 4; B *C. dietrichiae*, spike x 1; C *C. leiocaulon*, spike x 1; D *C. scaber*, spike x 1; E *C. cyperoides*, spike x 1; F *C. rigidellus*, spikelet x 3; G *C. perangustus*, spikelet x 3; H₁–H₂ *C. betchei*, H₁ spike x 1, H₂ spikelet x 3; I₁–I₂ *C. conicus*, I₁ inflorescence x 1/2, I₂ spike x 1; J₁–J₂ *C. decompositus*, J₁ inflorescence x 1/2, J₂ spike x 1; K *C. clarus*, spike x 1; L *C. fulvus*, spike x 1; M *C. flavus*, inflorescence x 1; N₁–N₂ *C. odoratus*, spikelet x 4, N₂ part of spikelet with longitudinal section of part of rachilla (cross-hatched) x 12.

yellowish to reddish brown; stamens 3; stigmas 3. Nuts brown, narrowly obloid, trigonous, *ca* $\frac{3}{4}$ length of glume. **Fig. 47F.**

Central and western Darling Downs district, usually on heavy soils.

64. *Cyperus fulvus* R. Br.

Perennial with short rhizome; stems rigid, erect, triquetrous, scabrous towards apex, swollen at base, 10–60 cm tall, 1.5–2 mm thick. Leaves narrow, keeled, scabrous, septate-nodulose, up to 4 mm wide. Inflorescences simple or compound, with 5–10 rays each up to 5 cm long and occasional secondary rays up to 1 cm long, involucre bracts 3–5, lower longer than inflorescence; spikes solitary, globose or hemispherical, 0.6–1(–1.5) cm wide; spikelets linear-oblong or oblong in outline, 0.4–0.8(–1.5) cm \times 0.15–0.25 cm, 4–10-flowered, rachilla scarcely winged; glumes 1.8–2.2 mm long, sides golden brown when mature; stamens 3; stigmas 3. Nuts brownish yellow, obloid-ovoid, trigonous, as long as or slightly shorter than glume. **Fig. 47L.**

Widespread in the region, often in open forests.

65. *Cyperus clarus* S. T. Blake

Perennial; stems tufted, erect, rigid, triquetrous, slightly scabrous below apex, otherwise smooth, 15–50 cm tall, 1–2 mm thick. Leaves flat or folded, sometimes longer than inflorescence, 2–6 mm wide. Inflorescences simple or subcompound, open or contracted into single spike with 0–6 rays each up to 4 cm long, involucre bracts 3–5, lower longer than inflorescence; spikes globose or hemispherical, very shortly apiculate, 2–2.5 cm wide; spikelets linear-oblong or oblong in outline, 0.8–1.5 cm \times 0.27–0.37 cm, 6–20-flowered, rachilla persistent, scarcely winged; glumes *ca* 3.3–3.5 mm long including 0.4–0.7 mm long slightly recurved awn, sides yellowish to brown; stamens 3; stigma 3. Nuts dusky brown, obloid-obovoid, trigonous, *ca* $\frac{2}{3}$ length of glume. **Fig. 47K.**

Widespread in Darling Downs and Burnett districts, in heavy soils; not common.

66. *Cyperus gunnii* J. D. Hook.

FLECKED FLATSEDE

Perennial with short thick rhizome; stems rigid, erect, triquetrous, smooth, thickened at base, 30–90 cm tall, 2–2.5 mm thick. Leaves folded or flat, septate-nodulose, 3–6 mm wide. Inflorescences simple or compound, with 5–10 primary rays each up to 6 cm long, secondary rays very short, involucre bracts 3 or 4, lower narrow and very long, septate-nodulose; spikes hemispherical or globose, 1.5–2.5 cm wide; spikelets very narrowly ovate in outline, 5–10 mm \times 1.5–2.5 mm, 8–12-flowered, rachilla narrowly winged; glumes *ca* 2.5 mm long, sides reddish brown; stamens 3; stigmas 3. Nuts pale brown, narrowly obloid, trigonous, *ca* $\frac{3}{4}$ length of glume.

Widespread in Darling Downs and Burnett districts, often alongside creeks; not common.

67. *Cyperus decompositus* (R. Br.) F. Muell.

***Mariscus decompositus* R. Br.**

Perennial with shortly creeping rhizome; stems rigid, erect, obtusely trigonous, minutely papillose or smooth, swollen at base, 0.6–1.2 m tall, 2–3 mm thick. Leaves flat, as long as inflorescence, 6–10 mm wide. Inflorescences more than once compound, with up to 12 primary rays each up to 20 cm long, secondary rays numerous, each up to 2 cm long, involucre bracts 5–7, lower much longer than inflorescence; spikes solitary, small, pedicellate, globose or hemispherical, 4–6(–10) mm wide; spikelets narrowly ovoid, 2–3 mm \times *ca* 2 mm, usually 2-flowered, rachilla broadly winged; flowering glumes *ca* 2 mm long, lower empty glumes shorter, sides yellowish to brown; stamens 3; stigmas 3. Nuts black or dark brown, ellipsoid, triquetrous, more than $\frac{1}{2}$ length of glume. **Fig. 47J.**

Collected once in the region, from Wide Bay district.

68. *Cyperus conicus* (R. Br.) Boeck.

***Mariscus conicus* R. Br.**

Perennial; stems tufted, erect, rigid, trigonous, minutely papillose or smooth, thickened at base, 30–75 cm tall, 1.5–2 mm thick. Leaves folded towards base, flat in upper part, as long as or shorter than inflorescence, 2–4(–5) mm wide. Inflorescences simple or compound, with 4–10 rays each up to 11 cm long, involucre bracts 3–5, lower longer

than inflorescence, margin spinulose; spikes globose, conical or ovoid, with 0–3 sessile heads at base, 0.7–1.5 cm wide; spikelets narrowly ovoid, 2.5–3 mm \times 1–1.5 mm, 1-, rarely 2-flowered, rachilla broadly winged; flowering glumes *ca* 2 mm long, lower empty glumes shorter, sides brownish striped; stamens 3; stigmas 3. Nuts black, ellipsoid, trigonous, *ca* $\frac{3}{4}$ length of glume. **Fig. 47I.**

Widespread in Moreton, Darling Downs and Wide Bay districts, usually on sandy soils.

69. *Cyperus odoratus* L.

Cyperus ferax Rich.

Annual with fibrous roots; stems rigid, erect, stout, triquetrous, smooth, 30–90 cm tall, 2–5 mm thick. Leaves flat, 0.3–1.2 cm wide. Inflorescences 1 or more times compound, with 7–12 unequal primary rays each up to 15 cm long, secondary rays very short, involucre bracts 6–8, lower longer than inflorescence; spikes obloid-cylindrical, 2–3 cm \times 1–2.5 cm, subtended by bracteoles; spikelets terete, flexuose, 0.5–2.5 cm \times 0.06–0.1 cm, 4–10-, rarely 20-flowered, rachilla broadly winged, internodes thickened and corky, each segment falling off separately when mature; glumes 2.5–3 mm long, sides stramineous to reddish brown; stamens 3; stigmas 3. Nuts brown to dark brown, obloid-obovoid, trigonous, *ca* $\frac{2}{3}$ length of glume. **Fig. 47N.**

Known in the region from a few localities in and around Brisbane, in damp places.

70. *Cyperus laevigatus* L.

Perennial with long creeping woody rhizome; stems close or distant, erect, rigid, trigonous, smooth, 15–60 cm tall, 2–3 mm thick. Leaves mostly reduced to sheathing bracts or with blades 1–2 cm long. Inflorescences simple, capitate, pseudolateral, involucre bracts 1 or 2, lower bract erect, appearing as continuation of stem, 2–10 cm long, second bract, if present, very short; spikes hemispherical to ovoid, up to 3 cm \times 3 cm; spikelets oblong-ovate in outline, subacute, 0.5–1.5 cm \times 0.1–0.35 cm, 12–30-flowered, rachilla straight, 4-angled, wingless; glumes *ca* 2–3 mm long, sides stramineous, margin frequently marked with small reddish blotches; stamens 3; stigmas 2. Nuts pale brown, ovoid or obovoid, biconvex, $\frac{1}{2}$ – $\frac{2}{3}$ length of glume. **Fig. 48A.**

Moreton and Wide Bay districts, usually in sandy areas close to the sea, often in brackish conditions.

71. *Cyperus unioides* R. Br.

Pycnus unioides (R. Br.) Domin

Rhizomatous perennial; stems tufted, rigid, erect or oblique, trigonous, smooth, 30–65 cm tall, 1–2 mm thick. Leaves 2–4 mm wide. Inflorescences simple or contracted, with 3–6 rays each up to 5 cm long, involucre bracts 2–4, lower up to 25 cm long; spikes hemispherical to broadly ovoid, 2–3 cm \times *ca* 2.5 cm; spikelets oblong-ovate in outline, 1–1.5 cm \times 0.4–0.5 cm, 10–26-flowered, rachilla flexuous, wingless; glumes *ca* 3.5 mm long, sides shining yellowish to brown, margin white hyaline; stamens 3; stigmas 2. Nuts shining black, obovoid to globose, biconvex, apiculate, *ca* $\frac{1}{3}$ length of glume. **Fig. 48B.**

Eastern Moreton district and south-eastern Wide Bay district, in swampy areas.

72. *Cyperus nervulosus* (Kükenthal) S. T. Blake

Cyperus pumilus L. var. *nervulosus* Kükenthal; *Pycnus pumilis* var. *punctatus* Domin

Annual; stems tufted, triquetrous, smooth, 4–25 cm tall, 0.5–1 mm thick. Leaves shorter than stems, 1–2 mm wide. Inflorescences simple or subcompound, with 1–5 unequal rays each up to 4 cm long, involucre bracts 3–5, lower much exceeding inflorescence; spikes globose, up to 2 cm \times 2 cm; spikelets linear, subacute, 0.5–1.5 cm \times *ca* 0.2 cm, up to 30-flowered, rachilla straight, wingless; glumes *ca* 1.5 mm long including *ca* 0.4 mm long recurved mucro, sides reddish brown; stamens 2; stigmas 2. Nuts grey, obloid-obovoid, biconvex, truncate at apex, apiculate, *ca* $\frac{1}{3}$ length of glume. **Fig. 48C.**

Known from all four districts in the region, but rare.

73. *Cyperus polystachyos* Rottb.

BUNCHY SEDGE

Rhizomatous; stems firm, tufted, erect, trigonous, smooth, 5–60 cm tall, 1–2 mm thick. Leaves shorter than stems, flat, 1–4 mm wide. Inflorescences usually crowded into dense

sessile head, or with several rays each up to 6 cm long, involucre bracts 3–6, lowest up to 20 cm long; spikes broadly ovoid, *ca* 2 cm \times *ca* 1.5 cm; spikelets numerous, suberect, congested, linear-ovate in outline, acute, 0.5–1.5 cm \times *ca* 0.2 cm, up to 30-flowered, rachilla angular, slightly winged; glumes 1.5–2 mm long, sides ferruginous to brownish grey; stamens 2; stigmas 2. Nuts brown to black, obloid, biconvex, apiculate, *ca* $\frac{1}{2}$ length of glume. **Fig. 48F.**

Widespread in the region, particularly common in eastern parts of the region.

74. *Cyperus sanguinolentus* Vahl

Cyperus eragrostis auct. non Lam., Vahl

Perennial, rhizomatous; stems tufted, decumbent at base and rooting at nodes, smooth, 5–50 cm tall, 0.5–1 mm thick. Leaves shorter than stems, 1–3 mm wide. Inflorescences dense heads of sessile spikelets or with 1–5 rays each up to 3 cm long; spikes broadly ovoid, 1–2 cm \times 1–1.5 cm; spikelets obloid-ovoid, 0.6–1.2 cm \times 0.2–0.25 cm, up to 24-flowered, rachilla straight, wingless; glumes 2–2.5 mm long, sides reddish brown to almost black; stamens 2 or 3; stigmas 2. Nuts yellow to black, obovoid to globose, biconvex, $\frac{2}{3}$ length of glume. **Fig. 48D.**

Widespread in Moreton, Darling Downs and Burnett districts, in damp places.

75. *Cyperus flavidus* Retz.

Cyperus globosus All.

Annual or perennial; stems tufted, rigid, erect, trigonous, smooth, 5–60 cm tall, 1–1.5 mm thick. Leaves narrow, longitudinally grooved, 0.5–2 mm wide. Inflorescences simple or compound, contracted into single spike or with 3–6 primary rays each up to 5 cm long and very short secondary rays, involucre bracts 2–4, lowest longer than inflorescence, frequently appearing to continue stems; spikes broadly ovoid, 2–3 cm \times 1.5–2.5 cm; spikelets linear in outline, acute, 1–2 cm \times 0.1–0.2 cm, 20–40-flowered, rachilla straight, wingless; glumes 1.5–2 mm long, sides yellow to dark brown; stamens 2; stigmas 2. Nuts dark brown to chestnut, obovoid or obloid-obovoid, biconvex, apiculate, *ca* $\frac{1}{3}$ length of glume. **Fig. 48E.**

Moreton and Wide Bay districts and extreme eastern Darling Downs district, in swampy or damp places.

76. **Cyperus flavescens* L.

Annual; stems tufted, trigonous, smooth, 5–30 cm tall, 0.5–1 mm thick. Leaves shorter than stems, *ca* 1 mm wide. Inflorescences simple, with solitary sessile spike or with 2 or 3 rays each up to 2 cm long, involucre bracts 2 or 3, longer than inflorescence; spikes broadly ovoid, up to 2.5 cm \times 2.5 cm; spikelets linear-oblong in outline, acute, 0.5–1.5 \times *ca* 0.2 cm, 10–20-flowered, rachilla straight, wingless; glumes *ca* 2 mm long, greenish brown; stamens 3; stigmas 2. Nuts brown to dark brown, with transverse white or dark brown wavy ridges, obovoid, biconvex, apiculate, shorter than glumes. **Fig. 48G.**

Widespread in warm parts of the world; naturalized in Moreton and eastern Darling Downs district, as a weed of damp disturbed places.

77. **Cyperus sesquiflorus* (Torrey) Mattf. & Kükenthal

KYLLINGA WEED

Kyllingia sesquiflora Torrey

Perennial with tufted, fragrant rhizome; stems smooth, 5–30 cm tall, *ca* 1 mm thick. Leaves 2–3 mm wide. Inflorescences capitate, whitish, usually with 2 smaller spikes at base, involucre bracts 3 or 4; central spike ovoid or obloid-cylindrical, 0.6–1.2 cm \times 0.5–0.6 cm; spikelets ovoid or narrowly ovoid, compressed, 2–2.5 mm \times *ca* 1 mm, 1-, rarely 2-flowered; glumes 2–2.5 mm long, lower 2 small, 3rd and 4th longer, sides frequently reddish brown; stamens 1 or 2; stigmas 2. Nuts becoming black, obovoid, biconvex, shortly apiculate, *ca* $\frac{2}{3}$ length of glume. **Fig. 48K.**

Native of Tropical Africa; naturalized in eastern parts of the region, often as a weed of gardens and lawns or disturbed damp places.



Fig. 48 CYPERACEAE — A–K *Cyperus* spp. — A₁–A₂ *C. laevigatus*, A₁ inflorescence x 1, A₂ spikelet x 3; B *C. unioides*, spike x 1; C₁–C₂ *C. nervulosus*, C₁ spike x 1, C₂ spikelet x 3; D₁–D₂ *C. sanguinolentus*, D₁ spikelet x 4, D₂ nut and T.S. of nut x 17; E₁–E₂ *C. flavidus*, E₁ spikelet x 4, E₂ nut and T.S. of nut x 17; F₁–F₄ *C. polystachyos*, F₁ inflorescence x 1, F₂ part of spikelet x 12, F₃ part of spikelet showing position of nuts x 17, F₄ nut and T.S. of nut x 25; G₁–G₂ *C. flavescens*, G₁ spikelet x 6, G₂ nut and T.S. of nut x 17; H₁–H₂ *C. brevifolius*, H₁ habit of plant x 1, H₂ pair of glumes x 12; I₁–I₂ *C. sphaeroideus*, I₁ inflorescence x 1, I₂ glume x 12; J *C. kyllingia*, glume x 12; K₁–K₂ *C. sesquiflorus*, K₁ inflorescence x 1, K₂ glumes x 8.

78. *Cyperus brevifolius* (Rottb.) Haask.**MULLUMBIMBY COUCH***Kyllinga brevifolia* Rottb.

Perennial with creeping rhizome; stems smooth, 5–40 cm tall, 0.5–1.5 mm thick. Leaves 1–3 mm wide. Inflorescences capitate, involucre bracts 3 or 4; spikes ovoid, 6–7 mm \times 6–8 mm, sometimes 1 or 2 small lateral spikes at base; spikelets compressed, *ca* 3 mm \times *ca* 1 mm, 1-flowered; glumes 1.5–3 mm long, lower 2 small, keel denticulate, sides greenish; stamen 1; stigmas 2. Nuts yellow to brown, obovoid, biconvex, apiculate, *ca* $\frac{1}{2}$ length of glume. **Fig. 48H.**

Widespread in Moreton and Wide Bay districts, as a weed of damp disturbed areas, often also a weed of gardens and lawns.

79. *Cyperus sphaeroideus* L. A. S. Johnson & O. D. Evans**KYLLINGA WEED***Kyllinga intermedia* R. Br.

Perennial with creeping rhizome; stems smooth, 5–40 cm tall, 0.5–1.5 mm thick. Leaves 1–3 mm wide. Inflorescences capitate, involucre bracts 3 or 4; spikes globular, 4–6 mm diameter, never with lateral spikes at base; spikelets compressed, *ca* 3 mm \times *ca* 1 mm, 1-flowered, sometimes with second incomplete flower present; glumes 1.5–3 mm long, lower 2 smaller, keel usually smooth, sides tending to yellowish often tinged with gold; stamens 2 or 3; stigmas 2. Nuts yellow to brown, obovoid, biconvex, apiculate, *ca* $\frac{1}{2}$ length of glume. **Fig. 48I.**

Known from a few places in Moreton district and eastern Darling Downs district, often in undisturbed places.

80. *Cyperus kyllingia* Endl.

Perennial, rhizome creeping; stems rigid, erect or oblique, triquetrous, 5–45 cm tall, 1–1.5 mm thick. Leaves 2–4 mm wide. Inflorescences capitate, ovoid-globose or ellipsoid, 0.8–1.2 cm \times 0.6–1 cm, sometimes 1 or 2 separate smaller spikes at base, involucre bracts 3 or 4; spikelets 3–3.5 mm \times *ca* 1.5 mm, 1- or 2-flowered; 2 glumes narrow, other glumes boat-shaped, 2.5–3.5 mm long, keel distinctly winged, sides becoming stramineous or often reddish brown; stamens 3; stigmas 2. Nuts yellowish brown to dark brown, ovoid, biconvex, apiculate, *ca* $\frac{1}{2}$ length of glume. **Fig. 48J.**

Collected once in the region, from Brisbane in 1939.

15. CLADIUM P. Browne

Perennial rhizomatous herbs; stems erect, hollow, rounded to obtusely trigonous, leafy throughout. Leaves 3-ranked. Inflorescences paniculate, with several racemously arranged corymbose partial panicles, each with sheathing bract at base; spikelets numerous in capitate clusters, 2-flowered, flowers bisexual, rachilla with very short internodes; glumes spirally arranged, lower sterile; hypogynous scales and bristles absent; stamens 2, rarely 3; stigmas 3. Fruits drupaceous, ovoid, seated on saucer-shaped disc.

About 3 species, mostly from tropical parts of the world; 1 species Australia, occurring in south-eastern Queensland.

1. *Cladium procerum* S. T. Blake**LEAFY TWIGRUSH***Machaerina procera* (S. T. Blake) Koyama; *Cladium mariscus* auct. non (L.) Pohl

Stems stout, terete at base, becoming obtusely trigonous in upper part, smooth, several-noded, sometimes producing tufts of leaves on branches at nodes, 1–3 m long, *ca* 1 cm thick. Leaves scabrous on keel and margin, lower nearly as long as stems, 0.6–1.2 cm wide. Inflorescences 2 or more times compound, interrupted, 15–50 cm \times 3.5–9 cm, with several corymbose partial panicles, peduncles of partial panicles compressed, 3–7 cm long, ultimate rays filiform, trigonous, up to 6 mm long, involucre bracts leaf-like, longer than partial panicles; spikelets in globose clusters, 3–4 mm long, oblong-ovate in outline when juvenile, becoming ovoid or ellipsoid in fruit, only lower flower usually fertile; glumes 5 or 6, brown, imbricate all around rachis, obtuse, membranous. Fruits rounded at base, apex obtuse, 2–2.5 mm \times 1.5–2 mm, nearly as long as glumes. **Fig. 50D.**

Moreton and Wide Bay districts mainly near the coast, also known from south-eastern Darling Downs districts, mainly in marshes and wet places.

16. **LEPIDOSPERMA** Labill.

Perennial herbs with woody rhizomes; stems tufted, nodeless, compressed or terete. Leaves basal, equitant, stem-like, or reduced to sheathing scales. Inflorescences paniculate, simple or compound, involucre bracts shorter than inflorescences; spikelets usually 2-flowered, upper flower bisexual, lower male or sterile, rachilla straight; glumes 4–7, spirally arranged, imbricate, lower 2–4 empty, short, upper fertile glumes longer than lower, narrow, acute; perianth consisting of 6 biseriate white hypogynous scales; stamens 3; style continuous with ovary, stigmas 3. Nuts obloid or obloid-ovoid, obtusely 3-angled, crowned by whitish style base.

About 40 species, south-eastern Asia, Australia and nearby islands of the Pacific region; *ca* 34 species Australia; 8 species south-eastern Queensland.

All species are known as **SWORDSEDGES**.

1. Stems terete; leaves reduced to sheathing scales or with point 1–2 cm long Stems flattened, biconvex, concavo-convex, or 4-angled; leaves with blades	1. <i>L. urophorum</i>	2
2. Stems and leaves distinctly 4-angled Stems and leaves flattened, biconvex or concavo-convex	2. <i>L. quadrangulatum</i>	3
3. Stems 2.5 mm or more wide Stems up to 2.5 mm wide		4 8
4. Inflorescences 2 or more times compound, lax, somewhat drooping or nodding Inflorescences \pm once compound, erect		5 6
5. Margins of leaves and stems distinctly scabrous, tuberculate, viscid; nuts <i>ca</i> 2 mm long Margins of leaves and stems slightly scabrous, neither tuberculate nor viscid; nuts 2–2.5 mm long	3. <i>L. tuberculatum</i> var. <i>grande</i> 4. <i>L. elatius</i>	
6. Stems flat or very slightly convex on one or both sides, usually less than 0.9 m long Stems distinctly biconvex, usually 0.8–2 m long	5. <i>L. laterale</i>	7
7. Margin of stems and leaves smooth; inflorescences 12–25 cm long, not dense, rachis not hidden by spikelets Margin of stems and leaves finely scabrous; inflorescences 7–15 cm long, very dense, rachis hidden by spikelets	6. <i>L. longitudinale</i> 7. <i>L. limicola</i>	
8. Stems 1–2 mm wide; inflorescences very narrow; spikelets <i>ca</i> 5 mm long Stems 2–2.5 mm wide; inflorescences not very narrow; spikelets 6–7 mm long	8. <i>L. lineare</i> 5. <i>L. laterale</i>	

1. **Lepidosperma urophorum** N. A. Wakefield

TAILED SWORDSEDGE

Lepidosperma canescens auct. non Boeck.
Stems terete, rigid, erect, smooth, up to 1 m tall, 1.5–2 mm thick. Leaves reduced to sheathing scales. Inflorescences 4–9 cm long, consisting of single spike or panicle of several slender spicate branches, subtended by short bracts; spikelets sessile, appressed to rachis, oblong-ovate in outline, subfalcate, 4–5 mm long, 2-flowered, upper flower bisexual, lower male or sterile; glumes 5, upper glumes acute, lower glumes usually shorter, obtuse, mucronate, juvenile glumes finely ciliate on margin and apex; stamens 3. Nuts obloid-ovoid, 3–3.5 mm long. **Fig. 491.**

Eastern Moreton district, on rocky mountain slopes.

2. **Lepidosperma quadrangulatum** A. A. Ham.

Stems erect, 4-angled, angles rounded and sides somewhat concave, striate, smooth, 1–2

m tall, *ca* 2.5 mm across. Leaves similar to stems but much shorter and tending to twist when dry. Inflorescences compound, dense, 2–5 cm \times *ca* 1 cm, with 4–6 partial panicles each with 6–8 spikelets, upper part undivided, lower part somewhat interrupted, subtended by bracts, lowest bract 1–3 cm long; spikelets sessile, erect, narrowly obloid, 5–7 mm long, 1–3-flowered, upper flower bisexual, lower male or sterile; fertile glumes acuminate. Nuts obovoid, 3-angled, ribs prominent, *ca* 2.5 mm long.

Northern Moreton district, in swampy seepage areas at base of Mt Coolum and Mt Peregrin (Emu Mtn).

3. *Lepidosperma tuberculatum* Nees var. *grande* Kükenthal

Stems flattened, slightly convex on one side and concave on other, rigid, erect, margin scabrous, up to 90 cm tall, 7–8 mm wide, tuberculate, viscid. Leaves similar to and as long as stems, margin viscid, 7–9 mm wide. Inflorescence up to 25 cm \times 4–5 cm, somewhat nodding, 2 or more times compound, of several clusters of partial panicles, subtended by bracts shorter than partial panicles, each cluster consisting of 2–3 branches, lower branch longer and interrupted; spikelets numerous, sessile, erect, oblong-ovate in outline, 4–5 mm long, 2-flowered, upper flower bisexual, lower male or sterile; glumes 5 or 6, \pm ovate, acute, lower glumes mucronate; stamens 3. Nuts obloid-ovoid, *ca* 2 mm long. **Fig. 49H.**

Mountainous region near Wallangarra in south-eastern Darling Downs district.

4. *Lepidosperma elatius* Labill.

TALL SWORDSEDGE

Stems flattened but slightly convex on both sides, solid, rigid, erect, somewhat scabrous on margin, 0.9–1.6 m tall, 8–10 mm wide. Leaves stem-like, up to 1.5 cm wide. Inflorescences 2 or more times compound, up to 40 cm \times 5 cm, of 8 or more clusters of partial panicles, subtended by bracts shorter than partial panicles; each cluster consisting of 2–4 branches, lower clusters longer and interrupted; partial panicles lax, erect or nodding, oblong-ovate in outline; spikelets numerous, erect, oblong in outline, falcate becoming subterbinate, 4–5 mm long, usually 2-flowered but sometimes more, upper flower bisexual, lower male or sterile; glumes 5 or 6, subacute or shortly mucronate, margin minutely scabrous, lower sterile glumes shorter than upper ones; stamens 3. Nuts obloid-ovoid, 2–2.5 mm long.

Mountainous rainforest areas along the border with New South Wales in the Moreton district.

5. *Lepidosperma laterale* R. Br.

VARIABLE SWORDSEDGE

Stems flattened or very slightly convex on one or both sides, erect or oblique, margin rough, 40–90 cm tall, 2–10 mm wide. Leaves stem-like, usually shorter than stems. Inflorescences semicompound, 6–30 cm \times 0.5–1.5 cm, consisting of clusters of 2, rarely 3 erect branches, subtended by leaf-like bract, upper part of inflorescence becoming undivided, lower clusters somewhat interrupted and with longer branches; spikelets sessile, at first oblong in outline, becoming obovate in outline, erect, 6–7 mm long, usually 2-flowered, upper spikelets bisexual, lower male or sterile; glumes 6, ovate, acute or shortly mucronate, lower slightly shorter than upper; stamens 3. Nuts obloid-ovoid, 2.5–3 mm long. **Fig. 49F.**

Three varieties occur in the region:

- | | | |
|--|---|---|
| 1. Stems 5–10 mm wide, flat; inflorescences 15–30 cm long | <i>L. laterale</i> var. <i>majus</i> | |
| Stems 2–6 mm wide, flattened or very slightly convex on one or both sides; inflorescences 6–20 cm long | | 2 |
| 2. Stems 2–2.5 mm wide, flat or convex on one side | <i>L. laterale</i> var. <i>angustum</i> | |
| Stems 2.5–6 mm wide, convex on both sides | <i>L. laterale</i> var. <i>laterale</i> | |

Lepidosperma laterale var. *majus* Benth. is widespread in mountainous parts of the region. *L. laterale* var. *angustum* Benth. is found in eastern parts of the region, in open forest. *L. laterale* var. *laterale* is widespread in Moreton and Wide Bay districts and eastern Darling Downs and Burnett districts, in eucalypt open forest.

6. *Lepidosperma longitudinale* Labill.

PITHY SWORDSEDGE

Stems flattened but slightly convex on both sides, pithy or hollow, rigid, erect, margin smooth, 0.8–2 m tall, 4–10 mm wide. Leaves similar to stems but shorter, up to 1 cm

wide. Inflorescences compound, up to 25 cm × 3–4(–7) cm, of 7–10 clusters, subtended by bracts shorter than partial panicle, each cluster consisting of 2–4 branches, lower clusters longer and somewhat interrupted; partial panicles oblong-ovate in outline; spikelets numerous, erect, oblong-ovate in outline, 6–7 mm long, 2–3-flowered, upper flower bisexual, lower male or sterile; glumes 6, oblong-ovate, obtuse or acute, blunt or mucronate, 2 or 3 lower sterile glumes shorter than upper ones; stamens 3. Nuts obloid-ovoid, 2.5–3 mm long. **Fig. 49D.**

Widespread in eastern Moreton and Wide Bay districts, in swampy sandy areas.

7. *Lepidosperma limicola* N. A. Wakefield

Stems flattened, biconvex, rigid, erect, margin finely scabrous, 0.8–1.5 m tall, 4–5 mm wide. Leaves shorter than stems. Inflorescences 7–15 cm long, of several partial panicles becoming continous in upper part, lower interrupted, each partial panicle subtended by bract, branches erect, very dense, obscuring rachis; spikelets numerous, appressed to rachis, acuminate, 6–7 mm long, 2-flowered, upper flower bisexual, lower male or sterile; glumes 6, subequal, narrowly ovate; stamens 3. Nuts obloid-ellipsoid, *ca* 3 mm long. **Fig. 49E.**

Collected once in the region, from near Wallangarra in southern Darling Downs district.

8. *Lepidosperma lineare* R. Br.

LITTLE SWORDSEGE

Stems flattened but slightly convex on both sides, rigid, erect, margin slightly scabrous, up to 40 cm tall, 1–2 mm wide. Leaves similar to and as long as or longer than stems. Inflorescences lax, 2–8 cm × *ca* 0.05 cm, consisting of single spike or panicle of few erect short branches, subtended by very short bract; spikelets *ca* 5 mm long, few, erect, oblong-ovate in outline, *ca* 5 mm long, 1- or 2-flowered, upper flower bisexual, lower male or sterile; glumes 5 or 6, ± ovate, upper acute, lower mucronate; stamens 3. Nuts obloid-ovoid, *ca* 3 mm long. **Fig. 49G.**

Granite areas near Stanthorpe in south-eastern Darling Downs district.

17. BAUMEA Gaudich.

Perennial herbs with short rhizomes often emitting long stolons; stems erect, tufted. Leaves distichously arranged, laterally compressed, 4- angled to terete, often reduced to sheathing scales, without ligules. Inflorescences paniculate, of few-several partial panicles; spikelets usually clustered, with 1–3 bisexual flowers, usually only lowest flower maturing a nut, rachilla persistent; glumes few, obscurely distichous, keeled, lower 3 empty, glume bearing fertile flower the largest; hypogynous bristles and scales absent; stamens 2 or 3; style deciduous, style base thickened, persistent on nut; stigmas 3. Nuts ovoid, or obloid, rounded or obscurely trigonous, stipitate or sessile, smooth to rugulose.

About 30 species, tropical and temperate parts of the world, especially Australia; 17 species Australia; 10 species south-eastern Queensland.

All species are known as TWIGRUSHES.

1. Leaves terete or subterete	2
Leaves flat, striate or with raised midrib, or leaves reduced to sheaths with a short mucro or leaves absent	7
2. Stems and leaves septate	1. <i>B. articulata</i>
Stems and leaves not septate	3
3. Leaves basal only	4
Leaves basal and 1 or 2 cauline	5
4. Stems 10–40 cm long, 0.5–0.75 mm thick; basal leaves longer than inflorescence	2. <i>B. nuda</i>
Stems 25–100 cm long, 1–2 mm thick; basal leaves shorter than inflorescence	3. <i>B. gunnii</i>

- | | | |
|---|--|---------|
| 5. Nuts 3–5 mm long, smooth, shining
Nuts 1.5–2 mm long | 4. <i>B. rubiginosa</i> | 6 |
| 6. Stems 1–2 m long, 2–5 mm thick; nuts whitish, smooth; inflorescences brown
Stems up to 1 m long, 1–2 mm thick; nuts yellowish to brownish, with many raised ridges; inflorescences dark brown | 5. <i>B. arthropphylla</i>
6. <i>B. teretifolia</i> | |
| 7. Leaves with raised midrib on either side or nearly 4-angular
Leaves flat or reduced to sheaths with short mucro or absent | 7. <i>B. tetragona</i> | 8 |
| 8. Leaves flat
Leaves absent or reduced to sheaths with short mucro | | 9
10 |
| 9. Leaves 2–4 mm wide, frequently curved; stems 0.5–0.9 mm thick
Leaves 1–2 mm wide, erect; stems 1 mm or more wide | 8. <i>B. muelleri</i>
9. <i>B. acuta</i> | |
| 10. Leaves absent
Leaves all reduced to long sheaths with short mucro, or with one or two cauline leaves | 3. <i>B. gunnii</i>
10. <i>B. juncea</i> | |

1. *Baumea articulata* (R. Br.) S. T. Blake**JOINTED TWIGRUSH***Cladium articulatum* R. Br.; *Machaerina articulata* (R. Br.) Koyama

Stems terete, rigid, striate, prominently transversely septate, 1–2 m long, 5–10 mm thick. Leaves basal, stem-like, transversely septate, sheaths shining brown. Panicles compound, lax, drooping, 15–40 cm long, of 4–6 fascicles of branches subtended by bracts, lowermost bract often produced into terete septate lamina up to 30 cm long, but shorter than inflorescence; spikelets numerous, solitary, or 2 or 3 together, 4–6 mm long, 3–5-flowered; glumes 5–7, 4–5 mm long. Nuts ovoid, trigonous, rugose, with corky edges. **Fig. 50H.**

Darling Downs, Moreton and Wide Bay districts, in very damp swampy areas.

2. *Baumea nuda* (Steudel) S. T. Blake*Schoenus nudus* Steudel; *Machaerina nuda* (Steudel) Kern

Stems somewhat compressed to subterete, filiform, sulcate, 10–40 cm long, 0.5–0.75 mm thick. Leaves stem-like, nearly twice as long as stems, basal leaves reduced to purple sheaths. Panicles spike-like, 3–7 cm long, interrupted, branches few with up to 3 clusters of spikelets, bracts with long brown sheaths, glume-like, lowest sometimes extended into short lamina; spikelets few, 5–7 mm long; glumes 3, 6–7 mm long, lowest 2 empty. Nuts dark reddish brown when mature, broadly ovoid, obscurely trigonous, slightly rugulose. **Fig. 50M.**

Moreton and Wide Bay districts, in damp swampy areas near the coast.

3. *Baumea gunnii* (J. D. Hook.) S. T. Blake**SLENDER TWIGRUSH***Cladium gunnii* J. D. Hook.; *Machaerina gunnii* (J. D. Hook.) Kern

Stems terete, slender, rigid, striate, 25–100 cm long, 1–2 mm thick. Leaves 1 or 2 per stem, stem-like, otherwise reduced to basal sheathing scales. Panicles spike-like, interrupted, 5–20 cm long; lowest bract with short blade, upper ones glume-like; spikelets few, 5–7 mm long, 1-flowered; glumes 3 or 4, ca 6 mm long, lowest 2 sterile. Nuts dark brown, ovoid or globular, at first 3-ribbed, finally quite smooth. **Fig. 50L.**

Moreton district, in damp areas, often in *Melaleuca* swamps.

4. *Baumea rubiginosa* (Sprengel) Boeck.**SOFT TWIGRUSH***Fuirena rubiginosa* Sprengel; *Cladium glomeratum* R. Br.; *C. rubiginosum* (Sprengel) Domin; *Machaerina rubiginosa* (Sprengel) Koyama

Stems biconvex to rounded, rigid, smooth, 30–100 cm long, 2–5 mm wide. Basal leaves subterete with pungent tip and long sheaths, usually shorter and wider than stem, cauline leaves with shorter blade. Panicles interrupted, 10–40 cm long, with 3–7 erect ovoid clusters of spikelets, lower ones distant, upper ones closer and shorter, subtended by long brown sheaths with short laminae; spikelets 5–7 mm long, 2- or 3-flowered; glumes 5, up

to 5–6 mm long, usually only lower one fertile. Nuts orange, finally becoming red, ellipsoid, obscurely trigonous, smooth, shining. **Fig. 50J.**

Moreton and Darling Downs districts, in damp and swampy areas.

5. *Baumea arthropphylla* (Nees) Boeck.

Chapelliera arthropphylla Nees; *Machaerina arthropphylla* (Nees) Koyama; *Baumea huttonii* (T. Kirk) S. T. Blake

Stems \pm rounded or compressed, slender, 1–2 m long, 2–5 mm thick. Basal leaves subterete, cauline leaves reduced to sheaths or 1 with short blade. Panicles spike-like, narrow, interrupted, 10–25 cm long, branches usually in distinct clusters subtended by long bracts; spikelets in dense clusters, 2- or 3-flowered; glumes 5, longest 5–6 mm long. Nuts light brown or whitish, obloid or obovoid, trigonous.

Collected in swampy areas on Stradbroke and Fraser Is.

6. *Baumea teretifolia* (R. Br.) Palla

Cladium teretifolium R. Br.; *Machaerina teretifolia* (R. Br.) Koyama

Stems terete or slightly compressed, rigid, smooth, 30–100 cm long, 1–2 mm thick. Leaves few, terete, pungent at tip, basal ones up to nearly as long as stems, cauline leaves with short blades. Panicles oblong in outline, erect, narrow, dense, much-branched, lowest bract reduced to membranous sheath with short erect point, upper ones shorter and glume-like; spikelets numerous, in dense clusters, 3–4.5 mm long, 1- or 2-, rarely 3-flowered; glumes 5 or 6, 3–3.5 mm long. Nuts yellowish to pale brown, obovoid-globular, obscurely trigonous, with many raised ridges. **Fig. 50K.**

Moreton and Wide Bay districts, in swamps and damp areas.

7. *Baumea tetragona* (Labill.) S. T. Blake

SQUARE TWIGRUSH

Lepidosperma tetragonum Labill.; *Cladium tetraquetrum* J. D. Hook.; *C. tetragonum* (Labill.) J. M. Black; *Machaerina tetragona* (Labill.) Koyama

Stems compressed to angular, grooved, 30–40 cm long, 1–1.5 mm thick. Leaves few, basal ones well developed, erect, rigid, somewhat flattened, with raised midrib on either surface, sometimes giving 4-angular appearance, acute, shorter and wider than stem, upper ones reduced to sheaths. Panicles oblong or ovate in outline, erect, dense or interrupted at base, 5–10 cm long, lowest bract a membranous sheath with short erect point, upper ones shorter and glume-like; spikelets numerous, erect, dense, 3.5–4 mm long; glumes 5, usually 3 sterile. Nuts obovoid, obscurely trigonous, with raised ridges. **Fig. 50L.**

Damp areas near Wallangarra in Darling Downs district.

8. *Baumea muelleri* (C. B. Clarke) S. T. Blake

Cladium muelleri C. B. Clarke; *Machaerina muelleri* (C. B. Clarke) Koyama

Stems compressed, obtuse-angular, slender, striate, smooth, 15–60 cm long, 0.5–0.9 mm thick. Leaves basal, flat, striate, frequently curved, tip acuminate, shorter than to as long as stem. Panicles narrow, erect, interrupted, up to 3 clusters of spikelets, upper two close together, lower one distant, subtended by glume-like bracts; spikelets few, *ca* 7 mm long, usually 1-flowered; glumes 3 or 4, lower 2 sterile. Nuts pale green to dark brown, ellipsoid-obovoid, obtusely trigonous, with raised ridges. **Fig. 50E.**

Moreton and Wide Bay districts, in peaty sandy soils near the coast.

9. *Baumea acuta* (Labill.) Palla

PALE TWIGRUSH

Schoenus acutus Labill.; *Cladium schoenoides* R. Br.; *Machaerina acuta* (Labill.) Kern

Stems \pm flat, 10–30 cm long, *ca* 1 mm wide. Leaves basal, flat, rigid, striate but with no raised midrib, shorter than stems. Panicles narrow, flexuose, interrupted, 2–4 cm long, subtended by glume-like bracts, lowest produced into rigid acute lamina as long as or overtopping inflorescence; spikelets few, clustered, 5–6 mm long, 1-flowered; glumes 5, *ca* 5 mm long, lower 3 sterile, uppermost glume sterile or containing male flower. Nuts dark brown, ovoid, very obtuse, often hanging by persistent anther filaments. **Fig. 50F.**

Known from few collections from swampy areas near Brisbane.

10. *Baumea juncea* (R. Br.) Palla**BARE TWIGRUSH***Cladium junceum* R. Br.; *Machaerina juncea* (R. Br.) Koyama

Stems terete, smooth, 30–90 cm long, 1–1.5 mm thick. Leaves basal and 1 or 2 cauline, reduced to long sheaths with short erect mucros. Panicles spike-like, 1–8 cm long, lowest branch sometimes distant, lowest bract reduced to short erect mucro, upper ones glume-like; spikelets few, dense, 4–7 mm long, with 1 bisexual flower; glumes 5, 3–5 mm long. Nuts dark brown to black, obovoid to globular, obscurely trigonous, slightly rugulose. **Fig. 50G.**

Moreton and Wide Bay districts, in swampy areas, frequently near brackish water.

18. PTILANTHELIUM Steudel

Perennial rhizomatous tufted herbs; stems rigid, erect, subterete, smooth. Leaves basal and canaliculate or reduced to sheathing bracts. Inflorescences solitary terminal compact head of spikelets enclosed by dark brown sheaths of two subtending bracts, lower bract overtopping inflorescences by 2–4 times; spikelets 1- or 2-flowered, bisexual, very narrow; glumes 5 or 6, lower 3 or 4 sterile, keeled; hypogynous bristles 3; stamens 3; stigmas 3. Nuts obloid, trigonous, with long persistent style.

2 species endemic in Australia; 1 species south-eastern Queensland.

1. *Ptilanthelium deustum* (R. Br.) Kükenthal*Carpha deusta* R. Br.; *Mesomelaena deusta* (R. Br.) Benth.

Stems 0.3–1.2 m tall. Leaves inrolled, shorter than stems, *ca* 1 mm wide. Inflorescences 1.5–2 cm × 1–1.5 cm, subtending bracts hyaline-edged sheaths tapering into long leaf-like point, lower bract overtopping inflorescence by 2–10 cm; spikelets numerous, narrow, 1.5–1.8 mm long, 1-flowered; glumes 5. Nuts pale brown, *ca* 5 mm long. **Fig. 49C.**

Widespread and common in coastal parts of Moreton district, less common in Wide Bay district and also known from south-eastern Darling Downs district.

19. CYATHOCHAETA Nees

Rhizomatous perennials; stems tall, rigid, terete to angular. Leaves mostly basal, few cauline, rigid. Inflorescences paniculate, narrow, lax, erect, consisting of several distant fascicles of few branches of unequal length; spikelets linear-ovate, 2-flowered, upper flower bisexual and fertile, lower male or sterile, rachilla shortened and straight; glumes 4, spirally arranged; hypogynous bristles 4 or 5; stamens 2, rarely 3; stigmas 2, style base dilated, persistent. Nuts narrowly obloid.

About 3 species endemic in Australia; 1 species south-eastern Queensland.

1. *Cyathochaeta diandra* (R. Br.) Nees**SHEATH RUSH***Carpha diandra* R. Br.

Stems tufted, erect, terete at base, obtusely trigonous above, smooth, 0.45–1.5 m tall, 2–2.5 mm thick. Leaves mostly basal, 1–4 cauline, shorter than stem, longitudinally grooved, margin scabrous, *ca* 1 mm wide; sheaths dark brown at base, lighter above, 4–6 cm long. Inflorescences 30–50 cm long, of 4–6 fascicles subtended by short leaf-like bracts; branches erect, up to 6 cm long, with few spikelets on peduncles of unequal length; spikelets 1.2–1.4 cm long; glumes shining, light brown, fertile glume up to 1.2 cm long; hypogynous bristles white, shorter than nuts, plumose at base, antrorsely scabrous above. Nuts pale green, 7–8 mm long. **Fig. 51O.**

Moreton and Wide Bay districts, in wallum country close to the coast.

20. TETRARIA Beauv.

Rhizomatous tufted herbs. Inflorescences short racemes or panicles; spikelets 2-flowered, both flowers fertile or upper fertile and lower sterile; glumes 4–8, 3–5 lower ones sterile;

hypogynous bristles 3–6 or more or minute or absent; stamens 3–6; stigmas 3 or 4. Nuts obovoid to ellipsoid, trigonous, crowned by persistent stylar base.

About 35 species, mostly South Africa, but also in Borneo and Australia; 1 species Australia, occurring in south-eastern Queensland.

1. *Tetraria capillaris* (F. Muell.) J. M. Black HAIR SEDGE
Chaetospora capillaris F. Muell.; *Elynanthus capillaceus* Benth.; *Cladium capillaceum* (Benth.) C. B. Clarke; *Machaerina capillacea* (Benth.) Koyama; *Heleocharis halmaturina* J. M. Black; *Tetraria halmaturina* (J. M. Black) J. M. Black; *Chaetospora capillacea* auct. non Nees, J. D. Hook.

Stems almost capillary, 20–60 cm tall, 0.4–0.8 mm thick. Leaves basal, blades up to 5 mm long or reduced to sheathing bracts. Inflorescences sessile or shortly pedicellate, narrow, of 2–4 spikelets; spikelets 3.5–5 mm long, 2-flowered, 1 flower usually fertile, subtended by inconspicuous bract shorter than inflorescence; hypogynous bristles minute or absent; stamens 3; stigmas 3. Nuts ellipsoid, 1.5–2 mm long, stylar base 1.5–2 mm long, persistent. **Fig. 49A.**

Rocky outcrops in a few places in eastern Moreton and Wide Bay districts; not common.

21. CAUSTIS R. Br.

Perennials, rhizomatous; stems terete. Leaves mostly reduced to sheathing scales. Inflorescences paniculate; young inflorescences contracted, narrow, dense, eventually elongating; spikelets 1- or 2-flowered, upper bisexual, lower male or sterile; glumes 3–6, entangled, all around rachilla, acuminate or aristate, lower shorter and empty; hypogynous bristles and scales absent; stamens 3–5; stigmas 3–5. Nuts obloid-ellipsoid, crowned by hard base of style.

6 species endemic in Australia; 4 species south-eastern Queensland.

- | | |
|---|------------------------|
| 1. Ultimate branchlets of mature plant not exceeding 0.4 mm wide; stamens 3 | |
| Ultimate branchlets of mature plant exceeding 0.5 mm wide; stamens 5 or 6 | 2 |
| 2. Mature ultimate branchlets flexuose and most terminating in spikelet; inflorescences open, sparse, rachis visible | |
| Mature ultimate branchlets straight or only slightly flexuose and most not terminating in spikelet; inflorescences very dense, rachis not visible | 1. <i>C. flexuosa</i> |
| 3. Ultimate branchlets straight or slightly flexuose; spikelets 1.2–1.4 cm long; nuts ca 7 mm long; stigmas 5 | |
| Ultimate branchlets strongly coiled; spikelets ca 0.7 cm long; nuts ca 4 mm long; stigmas 3 | 2. <i>C. blakei</i> |
| | 3. <i>C. pentandra</i> |
| | 4. <i>C. recurvata</i> |

1. *Caustis flexuosa* R. Br. CURLY WIG
Stems rigid, erect, smooth, many-noded, 0.3–1.2 m tall; 1.5–2 mm thick. Leaves reduced to dark brown sheathing scales. Inflorescences 20–50 cm long, with 8–10 distant fascicles of branches, ultimate branchlets flexuose, up to 0.3 mm wide, not dense, not hiding rachis, most with spikelets; young inflorescences contracted, narrow, very flexuose, branches and branchlets eventually elongating; spikelets ca 7 mm long, 2-flowered; glumes 4 or 5, dark brown, narrowly ovate, acuminate, lower shorter than upper; stamens 3; stigmas 3. Nuts ca 4 mm long. **Fig. 51H.**

Widespread in Moreton and Wide Bay districts, in rocky positions at higher altitudes

2. *Caustis blakei* Kükenhal
Stems rigid, erect, smooth, many-noded, up to 1.6 m tall, 2.5–3.5 mm thick. Leaves reduced to dark brown sheathing scales. Inflorescences 20–50 cm long, with 10–12 distant fascicles of branches, ultimate branchlets straight or slightly flexuose, up to 0.3 mm wide, very dense, hiding rachis, most without spikelets; young inflorescences contracted, flexuose, narrow, branches and branchlets eventually elongating; spikelets 6–7 mm long,

1-flowered; glumes 4 or 5, dark brown, long acuminate, lower sterile and shorter than upper; stamens 3; stigmas 3. Nuts *ca* 4 mm long. **Fig. 51G.**

Widespread in Moreton and Wide Bay districts and near Helidon in western Moreton district, on dry sandy soils near the coast.

3. *Caustis pentandra* R. Br.

THICK TWISTRUSH

Stems rigid, erect, smooth, many-noded, 0.6–1.2 m tall, 2–3 mm thick. Leaves reduced to blackish sheathing scales. Inflorescences 20–40 cm long, with 5–7 or more distant fascicles of branches, ultimate branchlets straight or flexuose, 0.5–1 mm wide, not dense, not hiding rachis; young inflorescences contracted, narrow, slightly flexuose, eventually elongating; spikelets 1.2–1.4 cm long, 2-flowered; glumes 6, brown when juvenile, almost black when mature, narrowly ovate, aristate; stamens 5; stigmas 5. Nuts *ca* 7 mm long. **Fig. 51I.**

Known from Darling Downs district, on sandy soil.

4. *Caustis recurvata* Sprengel

Stems rigid, erect, ascending or sometimes creeping, smooth, many-noded, 0.3–1.2 m tall, 1.5–2 mm thick. Leaves reduced to dark brown sheathing scales, but in young plants and after fire well developed blades are sometimes produced in lower parts. Inflorescences 20–50 cm long, with 10–12 distant fascicles of branches, ultimate branchlets strongly coiled, scabrous at edges, 0.8–1 mm wide, most of the branchlets without spikelets; young inflorescences dense and narrow with branchlets short and slightly curved, approaching maturity branches and branchlets elongate until finally strongly coiled and nearly hiding rachis; spikelets 6–7 mm long, solitary, 1-, rarely 2-flowered; glumes 4 or 5, dark brown, narrowly ovate, acuminate, lower shorter and more aristate than upper; stamens 5 or 6; stigmas 3. Nuts 4–5 mm long. **Fig. 51J.**

Moreton and Wide Bay districts in wallum country; common.

22. GAHNIA J. R. & G. Forster

Perennials with woody rhizomes, stolons absent; stems usually erect or decumbent, terete. Leaves long, linear, inrolled and appearing terete, ending in long subulate point. Inflorescences paniculate, with several fascicles of partial panicles; spikelets few-many, with 1 or 2 flowers, upper bisexual, lower when present sterile or male; glumes imbricate around rachis, usually outer ones longer, keeled, scabrous, acuminate, fertile ones shorter, obtuse, closely enveloping flower or nut; hypogynous bristles and scales absent; stamens 3–6, filaments usually persistent at base of nut; style 2–5-fid, stigmatic branches sometimes 2-fid, style base not dilated, adnate to nut. Nuts variable.

30 species, south-eastern Asia and the Pacific region; 22 species Australia; 6 species south-eastern Queensland.

All species are known as SAWSEDGES.

1. Inflorescences less than 5 mm wide	1. <i>G. insignis</i>	
Inflorescences more than 5 mm wide		2
2. Inflorescences obloid or ± cylindrical, rigid; nuts 5–6 mm long, with distinct mucro	2. <i>G. aspera</i>	
Inflorescences 2 or more times compound, consisting of several fascicles of partial panicles; nuts up to 4.5 mm long, not mucronate		3
3. Spikelets with 12–17 glumes, becoming clavate in fruit; lower glumes shorter than upper	3. <i>G. clarkei</i>	
Spikelets with less than 10 glumes, becoming ± ellipsoid in fruit; glumes ± alike or middle glumes longer than lower and upper		4
4. Inflorescences usually pale brown or brown when mature; anther filaments markedly elongating after anthesis and intertwining; nuts black or dark brown	4. <i>G. melanocarpa</i>	

Inflorescences usually dark brown or black when mature; anther filaments elongating slightly after anthesis and sticking together; nuts red or brownish red 5

5. Stems 6–10-noded, hollow; inflorescences 15–30-noded; glumes 6–10, unequal, \pm smooth, innermost glume obtuse; mature nuts obscurely 3- or 4-angled

5. *G. sieberiana*

- Stems 2–4-noded, solid; inflorescences 10–12-noded; glumes 6, \pm equal, papillose-scabrous, innermost glume \pm acute; nuts conspicuously 3- or 4-angled

6. *G. subaequiglumis*

1. *Gahnia insignis* S. T. Blake

Stems solid, 25–60-noded, 0.5–2 m tall, 1.2–1.5 mm thick. Leaves becoming involute, attenuate, 13–40 cm long, somewhat glaucescent and scabrous towards tips. Inflorescences erect, 7–16 cm \times ca 0.5 cm, with 5–8 fascicles each with mostly 2 partial panicles, peduncles thin and scabrous, scarcely exerted from bracts, lower bracts leaf-like, longer than inflorescence, upper ones shorter; spikelets solitary, 1-flowered, 4–6 mm long; glumes 2, rarely 3, narrowly ovate, upper glume more obtuse than lower, margin ciliolate; stamens 6, soon falling off; stigmatic branches 2–5. Nuts brown, shining, obloid to obovoid, obtusely trigonous, 2.2–2.8 mm long. **Fig. 51A.**

Known from the ranges and mountains of Moreton district along the border with New South Wales.

2. *Gahnia aspera* (R. Br.) Sprengel

Lampocarya aspera R. Br.

Stems solid, 1–3-noded, 40–80 cm tall, 3–8 mm thick. Leaves very long, involute, ending in subulate points longer than inflorescence, margin scabrous. Inflorescences rigid, dense, erect, somewhat interrupted at base, 10–25 cm \times 3–5 cm, with 7–10 fascicles of short partial panicles subtended by very long bracts; spikelets crowded, 6–8 mm long, 1-flowered; glumes 7 or 8, blackish brown, lower ones contracted into long acuminate involute apex, upper one obtuse; stamens 4–6, filaments lengthening and held by inrolled apices of sterile glumes which prevent nut from falling; stigmatic branches 3. Nuts reddish brown to dark brown, globular to ovoid, mucronate, smooth, 5–6 mm long. **Fig. 51B.**

Widespread in the region in a variety of habitats.

3. *Gahnia clarkei* Benl

TALL SAWSEEDGE

Stems hollow, few-noded, up to 2.5 m tall, 5–10 mm thick. Leaves broad at base becoming narrower and involute, subulate, margin scabrous, as long as stems. Inflorescences up to 90 cm \times 12 cm, somewhat lax, often 1-sided, with ca 10–13 fascicles of partial panicles, lower fascicles distant, up to several branches at each fascicle, often flexuous; spikelets numerous, 5–6 mm long, 2-flowered; glumes 12–17, lower 10 sterile, mucronate, short, upper ones obtuse, longer, up to 3.25 mm long; stamens 3–6, filaments elongating after anthesis and adhering together thus preventing nut from falling; stigmatic branches 3–5. Nuts shining reddish brown, ellipsoid, obscurely 3-angled, 2.5–2.75 mm long. **Fig. 51E.**

Eastern Moreton and south-eastern Wide Bay districts, in swampy areas.

4. *Gahnia melanocarpa* R. Br.

Stems solid, 3–4-noded, 1–2 m tall, 4–5 mm thick, 3- or 4-noded. Leaves as long as stem, broad at base becoming narrower and involute upwards. Inflorescences pale brown to brown, erect, 16–45 cm \times up to 5 cm, with 8–10 partial panicles, bracts exceeding inflorescence; spikelets numerous, 3–3.5 mm long, 1-flowered; glumes 4 or 5, lower 2 or 3 glumes sterile, ovate, acuminate, shortly aristate, upper fertile ones orbicular, obtuse; stamens 3, rarely 4, filaments elongating after anthesis and intertwining in their upper part preventing nut from falling; stigmatic branches 3. Nuts shining black or dark brown, ovoid or obovoid, obscurely 3-angled, 3–3.5 mm long. **Fig. 51F.**

Known from mountainous parts of the region.

5. *Gahnia sieberiana* Kunth

REDFRUITED SAWSEDGE

Gahnia psittacorum auct. non Labill., F. M. Bailey
Stems hollow, 6–10-noded, 1–3 m tall, 5–10 mm thick. Leaves broad at base, involute, subulate, margin scabrous, as long as stem. Inflorescences erect, up to 90 cm × 4–8 cm, often 1-sided, with 15–30 fascicles of partial panicles, lower fascicles distant, up to 4 branches at each fascicle, lower bracts as long as or longer than inflorescence; spikelets numerous, 5–6 mm long, 2-flowered; glumes 6–10, unequal in length, mostly smooth, lower acute, upper ones surrounding nut obtuse; stamens 3 or 4, filaments elongating after anthesis, those of upper and lower flowers adhering, thus preventing nut from falling; stigmatic branches 3. Nuts shining, reddish brown, ellipsoid, obscurely 3- or 4-angled, 3–4 mm long, smooth. **Fig. 51D.**

Known from coastal and mountainous parts of the region.

6. *Gahnia subaequiglumis* S. T. Blake
Stems solid, 2–4-noded, 0.6–1.6 m tall, 3–4 mm thick. Leaves broad at base, involute, subulate. Inflorescences 24–65 cm × 4–5 cm, with 10–12 fascicles of partial panicles, lower fascicles distant, lower bracts leaf-like, as long as or longer than inflorescence, upper ones progressively shorter; spikelets numerous, 4–4.5 mm long, 2-flowered; glumes 6, ± equal in length, scabrous-papillose, lower acuminate, upper acute and enclosing nut; stamens 3 or 4, filaments elongating after anthesis and adhering, thus preventing nut from falling; stigmatic branches 3. Nuts shining red, ellipsoid, conspicuously 3- or 4-angled, 3.9–4.4 mm long. **Fig. 51C.**

Known from the mountains of southern Moreton district.

23. SCHOENUS L.

Perennials with creeping rhizomes, seldom annuals; stems usually tufted, erect, oblique or decumbent, terete or obtusely trigonous. Leaves basal and cauline, linear or reduced to sheathing scales, sheaths often bearded at orifice. Inflorescences terminal or lateral; spikelets solitary or clustered, few-flowered, rachilla straight and short between sterile glumes, prominently zig-zag between fertile glumes; glumes distichous, keeled, lower ones and uppermost one usually sterile; hypogynous scales 6 or absent; stamens 1–6, usually 3; style slender, scarcely dilated at base, caducous; stigmas 3. Nuts obovoid-globular, trigonous, glabrous or hispidulous, smooth to rugulose.

About 80 species, Europe, South America, Asia, Australia and nearby islands of the Pacific Ocean; 51 species Australia; 17 species south-eastern Queensland.

1. Inflorescences consisting of 1, rarely 2 spikelets or contracted into
irregular umbels forming terminal or lateral heads 2
Inflorescences panicles, mostly of distant fascicles of branches, or
racemes 8
2. Inflorescences of 1, rarely 2 spikelets 1. *S. pachylepis*
Inflorescences of several spikelets 3
3. Margin of glumes densely ciliate; involucre bracts 2–6; inflorescences
turbinate 2. *S. turbinatus*
Margin of glumes glabrous or very slightly ciliate; involucre bracts
0–2; inflorescences globular or hemispherical 4
4. Leaves with well developed blades up to several cm long; hypogynous
bristles 6 5
Leaves reduced to sheaths or with short blade up to 2 cm long;
hypogynous bristles absent 6
5. Rhizomes creeping, plants not tufted; involucre bracts without dark
sheaths below; spikelets ovate to narrowly ovate in outline;
hypogynous bristles plumose at base 3. *S. nitens*
Rhizomes short, plants tufted; involucre bracts with dark sheaths
below, spikelets linear-ovate; hypogynous bristles not plumose 4. *S. apogon*



Fig. 50 CYPERACEAE — A–C *Schoenus* spp. — A₁–A₂ *S. maschalinus*, A₁ part of inflorescence x 4, A₂ nut with hypogynous bristles x 25; B₁–B₂ *S. apogon*, B₁ inflorescence x 1, B₂ nut with hypogynous bristles x 25; C₁–C₂ *S. latelaminatus*, C₁ inflorescence x 1, C₂ nut and T.S. of nut x 25; D₁–D₂ *Cladium procerum*, D₁ portion of stem x 1, D₂ part of inflorescence x 1; E₁–E₂ *Baumea muelleri*, E₁ habit x $\frac{1}{4}$, E₂ inflorescence x 1; F *B. acuta*, inflorescence x 1; G₁–G₂ *B. juncea*, G₁ sheath with mucro x 1, G₂ inflorescence x 1; H *B. articulata*, part of stem showing septa x 1; I₁–I₂ *B. tetragona*, I₁ part of leaf x 6, I₂ inflorescence x $\frac{2}{3}$; J₁–J₂ *B. rubiginosa*, J₁ part of inflorescence x 1, J₂ nut x 12; K₁–K₂ *B. teretifolia*, K₁ part of inflorescence x 1, K₂ nut x 12; L₁–L₃ *B. gunnii*, L₁ basal sheath x 1, L₂ inflorescence x 1, L₃ nut x 12; M *B. nuda*, inflorescence x 1.

- | | | | |
|--|-------|-------------------------------|----|
| 6. Stems <i>ca</i> 0.4 mm wide; inflorescences appearing lateral | . . . | 5. <i>S. ornithopodioides</i> | 7 |
| Stems 0.5 mm or more wide; inflorescences terminal | . . . | | |
| 7. Orifice of sheaths distinctly ciliate; glumes dark brown; coastal areas | . . . | 6. <i>S. ericetorum</i> | |
| Orifice of sheaths glabrous; glumes pale; non coastal areas | . . . | 7. <i>S. kennyi</i> | |
| 8. Spikelets 18 or more per inflorescence | . . . | | 9 |
| Spikelets less than 18 per inflorescence | . . . | | 16 |
| 9. Leaves with well developed blades more than 2 cm long | . . . | | 10 |
| Leaves reduced to sheaths with blades up to 2 cm long | . . . | | 13 |
| 10. Stems 60–90 cm tall, 2–3 mm thick | . . . | 8. <i>S. falcatus</i> | |
| Stems up to 50 cm tall, 0.5–1.5 mm thick | . . . | | 11 |
| 11. Inflorescences appearing axillary; hypogynous bristles absent | . . . | 9. <i>S. latelaminatus</i> | |
| Inflorescences terminal; hypogynous bristles 6 | . . . | | 12 |
| 12. Nuts smooth, hispid at apex; spikelets \pm erect, pale brown | . . . | 10. <i>S. paludosus</i> | |
| Nuts minutely reticulate, not hispid; spikelets oblique to erect, usually dark brown | . . . | 4. <i>S. apogon</i> | |
| 13. Stems with 1–4 nodes; leaf sheaths present on stems | . . . | 11. <i>S. vaginatus</i> | |
| Stems without nodes; leaf sheaths at base of stem only | . . . | | 14 |
| 14. Leaf sheaths glabrous at orifice; spikelets 8–10 mm long | . . . | 12. <i>S. brevifolius</i> | |
| Leaf sheaths ciliate at orifice; spikelets 4–8 mm long | . . . | | 15 |
| 15. Stems 0.5–1 mm thick; glumes red glandular-dotted; nuts slightly ciliate on angles | . . . | 13. <i>S. sparteus</i> | |
| Stems 1.5–2 mm thick; glumes not red glandular-dotted; nuts glabrous | . . . | 14. <i>S. melanostachys</i> | |
| 16. Spikelets 1.2–2.5 cm long | . . . | | 17 |
| Spikelets 0.2–0.8 cm long | . . . | | 18 |
| 17. Glumes acute, ciliate along whole margin; hypogynous bristles 4–6 | . . . | 15. <i>S. calostachyus</i> | |
| Glumes with gland-like mucro, margin ciliate at apex only; hypogynous bristles absent | . . . | 16. <i>S. scabripes</i> | |
| 18. Spikelets 2–4 mm long; hypogynous bristles 6 or fewer; perennials | . . . | 17. <i>S. maschalinus</i> | |
| Spikelets <i>ca</i> 8 mm long; hypogynous bristles absent; annuals | . . . | 9. <i>S. latelaminatus</i> | |

1. *Schoenus pachylepis* S. T. Blake

Perennial; stems \pm erect, striate and grooved, 30–40 cm tall, *ca* 1 mm thick. Leaves basal, reduced to sheaths; sheaths reddish brown, not bearded. Inflorescences with solitary, rarely 2, terminal spikelets, involucre bract 1, glume-like with short obtuse mucro, shorter than spikelet; spikelet erect, dusky brown, turgid, narrowly ovate in outline, acute to acuminate, 1.5–2 cm long, 1-flowered; glumes 7–10, ovate or oblong-ovate, obtuse, fertile glumes *ca* 1 cm long; hypogynous bristles 6, fleshy, oblong-ovate, obtuse, *ca* as long as torus; stamens 3. Nuts brown, obloid or cylindrical, obtuse. **Fig. 49J.**

Coastal swampy areas of Moreton and Wide Bay districts; not common.

2. *Schoenus turbinatus* (R. Br.) Poiret

Chaetospora turbinata R. Br.

Perennial; stems \pm erect, striate, 15–40 cm tall, 0.7–1 mm thick. Leaves much shorter than stems, flexuose, sheaths not bearded. Inflorescences capitate, becoming turbinate, up to 1 cm diameter, consisting of several fascicles of sessile spikelets, involucre bracts 2–6, dilated at base, extending up to 10 cm beyond inflorescence; spikelets brown, oblong-ovate in outline, *ca* 6 mm long, 1-flowered; glumes 6–9, narrowly ovate, margin ciliate, fertile glumes *ca* 5 mm long; hypogynous bristles 6, white, as long as nut, plumose;

stamens 3, connective of anther produced into long dark red appendage. Nuts pyriform, apiculate, rugulose, attenuate at base.

Known from a few coastal localities in Wide Bay district.

3. *Schoenus nitens* (R. Br.) Poiret

SHINY BOGRUSH

Chaetospora nitens R. Br.

Perennial; stems \pm erect, grooved, 5–30 cm tall, *ca* 0.8 mm thick. Leaves basal, shorter than to as long as inflorescence, blades present, sheaths not bearded. Inflorescences capitate, 2–10 mm diameter, with 2–30 spikelets in sessile cluster, involucre bracts 2, lower erect, 1–3 cm long and continuous with stem, giving inflorescence appearance of lateral head, sometimes reflexed; spikelets brown, ovate to narrowly ovate in outline, 2-flowered, 3–4 mm long; glumes 4 or 5, obtuse, margin glabrous, 2–3 mm long; hypogynous bristles 6, plumose, at base, longer than nut; stamens 3. Nuts brown, shining, ovoid, trigonous, smooth. **Fig. 490.**

Sandy coastal areas of Moreton and Wide Bay districts; not common.

4. *Schoenus apogon* Roemer & Schultes

FLUKE BOGRUSH

Schoenus brownii J. D. Hook.

Perennial; stems \pm erect, grooved, 8–30(–40) cm tall, *ca* 0.5 mm wide. Basal leaf-sheaths rather open and whitish, cauline sheaths long, closed and reddish brown with longer erect linear or filiform blades, sheaths not bearded. Inflorescences irregular umbels or occasionally terminal heads of few sessile or shortly pedicellate spikelets, 1.5–15 cm long, involucre bracts 1 or 2, leaf-like with reddish brown sheaths; spikelets brown to black, linear-ovate in outline, somewhat flattened, 1- or 2-flowered, 3.5–5.5 mm long; glumes 6, acute, margin hyaline and glabrous, fertile glumes *ca* 3 mm long; hypogynous bristles 6, shorter than to longer than nut; stamens 3. Nuts white, broadly ovoid, prominently 3-ribbed, minutely reticulate. **Fig. 50B.**

Widespread in the region, on damp soils.

5. *Schoenus ornithopodioides* (Küenthall) S. T. Blake

Schoenus ericetorum R. Br. var. *ornithopodioides* Küenthall

Perennial; stems \pm erect, grooved, 12–35 cm tall, *ca* 0.4 mm thick. Leaves basal, reduced to short erect or recurved subulate blades 4–7 mm long, sheaths usually not bearded. Inflorescences capitate, with 2–4 spikelets, involucre bracts erect, up to 1 cm long, continuous with stem, giving inflorescence appearance of lateral head; spikelets dark brown, narrowly ovate in outline, curved, *ca* 3 mm long, 1-flowered; glumes 4 or 5, narrowly ovate, margin ciliate, *ca* 3 mm long; hypogynous bristles absent; stamens 3. Nuts mottled brown, ovate, obscurely trigonous, papillose. **Fig. 49N.**

Sandy coastal areas of Moreton and Wide Bay districts; not common.

6. *Schoenus ericetorum* R. Br.

Perennial; stems \pm erect, grooved, 25–40 cm tall, 0.5–0.8 mm thick. Leaves reduced to sheaths or with short blade 1–2 cm long, sheaths bearded at orifice. Inflorescences terminal, compact, dark brown to black, 1–1.5 cm diameter, with 4–20 shortly pedicellate spikelets, involucre bracts 2, lower one reflexed or sometimes exceeding inflorescence by *ca* 1 cm; spikelets narrowly-ovate in outline, \pm circular in cross section, curved, 2-flowered, *ca* 6 mm long; glumes 7–10, obtuse, margin of lower glumes ciliate, fertile glumes *ca* 4 mm long; hypogynous bristles absent; stamens 3. Nuts mottled brown, obovoid, obtusely trigonous, notched at apex, papillose-rugose. **Fig. 49L.**

Wallum areas in Moreton district; not common.

7. *Schoenus kennyi* (F. M. Bailey) S. T. Blake

Arthrostylis kennyi F. M. Bailey

Perennial; stems \pm erect, 25–50 cm tall, *ca* 0.8 mm thick. Leaves with short distinct subulate blades, basal sheaths tightly convolute, glabrous. Inflorescences terminal, globular, up to 1 cm diameter, with few fascicles of sessile spikelets, involucre bracts 2, usually shorter than inflorescences and inconspicuous; spikelets whitish to brown, subterete, oblong-ovate in outline, acute, *ca* 5 mm long; glumes 6, ovate or narrowly

ovate, membranous, hyaline, fertile glumes *ca* 4 mm long; hypogynous bristles absent; stamens 6. Nuts brown, ovoid, 3-ribbed, wrinkled. **Fig. 49K.**

Darling Downs and Burnett districts and in western Moreton district, on stony or sandy soils; not common.

8. *Schoenus falcatus* R. Br.

Perennial; stems erect, obtusangular, striate, 60–90 cm tall, 2–3 mm thick. Basal leaves 2–5 mm wide at base, tapering to fine point; cauline leaves 2–4, shorter than basal leaves. Inflorescences paniculate, 2 or more times compound, lax, 20–40 cm long, with up to 10 distant fascicles of 2–5 slender very unequal branchlets; spikelets numerous, pale brown, pedicellate, oblong-ovate in outline, falcate, 0.7–0.9(–1.2) cm long, 3–7-flowered; glumes 8–10, oblong-ovate, acute, glabrous with scabrous keel, margin hyaline, fertile glumes 5–6.5 mm long, lower sterile ones shorter; hypogynous bristles absent or 1 *ca* length of nut; stamens 3. Nuts brown, broadly ovoid, trigonous, pitted.

Collected once on Peel I. in Moreton district.

9. *Schoenus latelaminatus* Küenthall

MEDUSA BOGRUSH

Annual; stems erect, striate, 7–30 cm tall, 0.5–1.5 mm thick. Leaves basal, with well developed blades, shorter than stems, flat, 1–2 mm wide, sheaths reddish brown, orifice oblique, not bearded. Inflorescences racemose or \pm paniculate, 3–15 cm long, appearing axillary to leaf-like bracts, up to 9 cm long, with 1–5 somewhat distant fascicles of branches; spikelets sessile or shortly pedicellate, ovate in outline, *ca* 8 mm long, 3–6-flowered; glumes 7–9, narrowly-ovate, fertile glumes yellowish brown with faint brown stripe near margin, *ca* 4 mm long, scabrous on keel; hypogynous bristles absent; stamens 3. Nuts white, ovoid, trigonous, minutely pitted. **Fig. 50C.**

Recorded once from Ballandean in south-eastern Darling Downs district.

10. *Schoenus paludosus* (R. Br.) Poiret

Chaetospora paludosa R. Br.; *Tricostularia paludosa* (R. Br.) Poiret

Perennial; stems \pm erect, striate, 15–50 cm tall, 0.7–1 mm thick. Basal and cauline leaves with well developed blades, blades flat, apex very obtuse, up to 1.5 mm wide, sheaths pale reddish brown, orifice glabrous; cauline leaves 1 or 2. Inflorescences interrupted panicles 10–35 cm long, with several branches of few spikelets, subtended by leaf-like bracts; spikelets solitary, pedicellate, reddish brown, usually erect, narrowly ovate in outline, compressed, 5–6 mm long, 1-flowered; glumes 6, distichous, acute, narrowly ovate, fertile glumes *ca* 5 mm long; hypogynous bristles 6, shorter than nut; stamens 3. Nuts becoming very dark brown, obovoid, apiculate, hispidulous towards apex, 3-ribbed. **Fig. 49Q.**

Moreton and Wide Bay districts, in swampy coastal areas; moderately common.

11. *Schoenus vaginatus* F. Muell.

Perennial; stems \pm erect, 30–60 cm tall, *ca* 1 mm thick. Basal leaves reduced to sheaths with short subulate points, 1–2 cm long, sheaths dark brown, bearded at orifice; cauline leaves 2 or 3, similar to basal leaves. Inflorescences interrupted panicles, 4–15 cm long, with 1–5 fascicles of few branches each with 1–5 \pm pedicellate spikelets, involucrel bracts short, similar to cauline leaves; spikelets linear-ovate in outline, slightly compressed, 8–10 mm long, 2- or 3-flowered; glumes 6, oblong-ovate, acuminate, ciliate towards apex; hypogynous bristles absent; stamens 3. Nuts brown, obloid-ovoid, trigonous, transversely rugulose. **Fig. 49R.**

Eastern Moreton and Wide Bay districts, often on rocky mountain slopes; not common.

12. *Schoenus brevifolius* R. Br.

Perennial; stems \pm erect, deeply 1-grooved, 30–90 cm tall, 1–1.5 mm thick. Leaves basal, reduced to sheaths; sheaths dark brown, orifice glabrous. Inflorescences interrupted panicles, somewhat lax and narrow, 5–25 cm or more long, with several fascicles of spikelets almost clustered on short peduncles, lower fascicles more distant, involucrel bracts of fascicles erect, short; spikelets numerous, brown, shortly pedicellate, oblong-ovate in outline, compressed, 8–10 mm long, 2- or 3-flowered; glumes 7–9, narrowly

ovate, margin ciliate, fertile glumes *ca* 8 mm long; hypogynous bristles absent; stamens 3. Nuts stramineous, obovoid, prominently 3-ribbed, slightly rugulose.

Swampy coastal areas of Moreton and Wide Bay districts; moderately common.

13. *Schoenus sparteus* R. Br.

Perennial; stems \pm erect, 15–75 cm tall, 0.5–1 mm thick. Basal leaves short, subulate, blades recurved, 1–10 cm long, sheaths brown, orifice densely ciliate; usually 1 or 2 cauline leaves similar to basal present or cauline leaves absent. Inflorescences racemes or occasionally \pm paniculate, 2–15 cm long, with 1–3 fascicles of 1–3 branches, each branch with 1 or occasionally 2 or 3 spikelets, involucre bracts short and leaf-like; spikelets dark brown, pedicellate, narrowly ovate in outline, acute, 6–8 mm long, 2- or 3-flowered; glumes 7–9, narrowly ovate, acute, margin ciliate, gland-dotted, \pm bearded, fertile glumes 6–7 mm long, sterile ones shorter; hypogynous bristles absent; stamens 3. Nuts brown with darker blotchy markings, ovoid, obtusely trigonous, slightly ciliate on angles.

Fig. 49P.

Known from few places in coastal parts of Moreton and Wide Bay districts.

14. *Schoenus melanostachys* R. Br.

Perennial; stems \pm erect, striate, 0.6–3 m tall, 1.5–2 mm thick. Leaves basal, reduced to sheaths, bearded at orifice. Inflorescences interrupted panicles 3–25 cm long, with 3–7 fascicles of 2–5 branches, involucre bracts reduced to short flat obtuse blade; spikelets dark brown, pedicellate, linear-ovate in outline, slightly falcate, 4–8 mm long, 1–3-flowered; glumes 6–10, narrowly ovate, acute, ciliate on margin, fertile glumes 5–7 mm long, lower sterile ones shorter; hypogynous bristles usually absent; stamens 3, anthers with dark appendage to connective. Nuts staminateous, ovoid, trigonous, transversely rugulose.

Widespread in eastern Moreton district, also known from eastern Wide Bay district and south-eastern Darling Downs district.

15. *Schoenus calostachyus* (R. Br.) Poiret

Chaetospira calostachya R. Br.

Perennial; stems \pm erect, deeply 1-grooved, 50–100 cm tall, 1–2 mm thick. Leaves with well developed blades, basal leaves long, rigid, narrow, keeled, margin scabrous; cauline leaves 1–3, shorter, broader, sheaths open and \pm ciliate. Inflorescences interrupted racemes up to 50 cm long; involucre bracts short, leaf-like with long dark sheaths; spikelets solitary or 2 together, erect or nodding on pedicels up to 10 cm long, oblong-ovate in outline, compressed, 2–2.5 cm long, 3–5-flowered; glumes 9–11, narrowly ovate, acute, margin ciliate, fertile glumes *ca* 2 cm long, lower sterile ones progressively shorter; hypogynous bristles 4–6, shorter than nut; stamens 3. Nuts blackish brown, ovoid, trigonous, transversely tuberculate. **Fig. 49M.**

Widespread in swampy coastal areas of Moreton and Wide Bay districts; common.

16. *Schoenus scabripes* Benth.

Perennial; stems \pm erect, deeply 1-grooved, 0.6–1.3 m tall, 1.5–2 mm thick. Leaves few, reduced to sheaths with short obtuse mucro, bearded at orifice. Inflorescences racemose, 7–15 cm long, with 2 distant fascicles of 2–4 branches, involucre bracts short, similar to leaf sheaths; spikelets pedicellate, linear-ovate, acuminate, 1.2–2 cm long, 2-flowered; glumes 6–8, chartaceous, narrowly ovate, obtuse with dark brown gland-like mucro, slightly ciliate at apex, fertile glumes 1.2–1.5 cm long, sterile ones shorter; hypogynous bristles absent; stamens 3, anthers with dark brown appendage to connective. Nuts brown, obloid, trigonous, transversely rugulose.

Swampy coastal areas of Moreton and Wide Bay districts; not common.

17. *Schoenus maschalinus* Roemer & Schultes

Schoenus foliatus S. T. Blake

Stems decumbent and rooting at nodes, 4–20 cm tall, 0.3–0.5 mm thick. Leaves filiform, spreading, 1–3 cm \times *ca* 0.1 cm. Inflorescences racemes 3–8 cm long, appearing axillary

to leaf-like bracts, with 3 or 4 distant fascicles of branches each with 1–3 spikelets; spikelets stramineous to brown, sessile or shortly pedicellate, narrowly ovate to ovate in outline, 2–4 mm long, 1- or 2-flowered; glumes 3–5, narrowly ovate in outline, fertile glumes 2–3 mm long; hypogynous bristles 6 or fewer, scabrous, shorter than or as long as nut; stamens 3. Nuts white mottled brown, trigonous, apiculate, smooth. **Fig. 50A.**

Known from Moreton district from ranges along the border with New South Wales and also from south-eastern Darling Downs district; rare.

24. RHYNCHOSPORA Vahl

Perennial or annual herbs; stems usually tufted, erect, triquetrous. Leaves linear, basal or cauline, flat or grooved. Inflorescences capitate or paniculate; bracts leaf-like; spikelets solitary or in clusters with 1 or 2 bisexual flowers and often 1 or 2 male flowers, oblong-ovate in outline, rounded or \pm flat; glumes imbricate all round rachis, 5–8, outer 3 or 4 shorter and empty; hypogynous bristles 3–6, rarely 7, stamens 2 or 3; style slender, conically dilated at base, style base persistent on nut, stigmas 2. Nuts variable, smooth, papillose or glabrous.

About 200 species worldwide; 13 species Australia; 4 species south-eastern Queensland.

- | | | | | | | |
|---|---|---|---|---|---|---|
| 1. Inflorescences compound panicles or spikelets clustered in loose corymbs | . | . | . | . | . | 2 |
| Inflorescences solitary dense heads | . | . | . | . | . | 3 |
| 2. Inflorescences large loose compound panicles; stylar bases nearly as long as nuts and furrowed on both sides; stems stout, 0.7–2 m tall | | | | | | |
| Inflorescences of several small irregular corymbs; stylar bases nearly as long as nuts but not furrowed on either side; stems slender, up to 1 m tall | . | . | . | . | . | |
| 1. <i>R. corymbosa</i> | | | | | | |
| 2. <i>R. brownii</i> | | | | | | |
| 3. Glumes keeled throughout; nuts laterally compressed and biconvex, margin ribbed; stylar bases $\frac{1}{3}$ length of nuts | | | | | | |
| Glumes keeled only towards apex; nuts dorsiventrally compressed and flat, margin rounded; stylar bases nearly as long as nuts | . | . | . | . | . | |
| 3. <i>R. rubra</i> | | | | | | |
| 4. <i>R. heterochaeta</i> | | | | | | |

1. *Rhynchospora corymbosa* (L.) Britton

Scirpus corymbosus L.; *Rhynchospora aurea* Vahl

Perennial with short rhizome; stems stout, leafy throughout, 0.7–2 mm tall, 0.4–1.5 cm thick. Leaves mainly flat, 0.5–1.5 cm wide, scabrous. Inflorescences with numerous spikelets in large loose compound panicles up to 15 cm diameter, subtended by long leafy bracts; spikelets pale brown to brown, narrowly ovate in outline, 6–8 mm long, usually with 1 bisexual flower and 1 or 2 male flowers; hypogynous bristles 6, exceeding length of nut; stylar base long conical, compressed, as long as and as wide as nut, longitudinally furrowed on both sides. Nuts obovate in outline, compressed. **Fig. 51L.**

Widespread in eastern Moreton and Darling Downs districts, in damp areas.

2. *Rhynchospora brownii* Roemer & Schultes

Rhynchospora glauca Vahl

Perennial; stems slender, 0.3–1 m tall, 2–4 mm thick. Leaves few, basal and cauline, distant, flat, margin scabrous, 1–4 mm wide. Inflorescences consisting of spikelets clustered in several small loose irregular corymbs, 1–2 cm diameter, subtended by leafy bracts; spikelets dark brown, narrowly ovate in outline, 5–6 mm long with 1 or 2 bisexual and 1 or 2 male flowers; hypogynous bristles 6 or 7, mostly longer than nut; stylar base conical, shorter than but as wide as apex of nut, not furrowed. Nuts obovate to oblong-ovate in outline, transversely wrinkled. **Fig. 51N.**

Moreton and Wide Bay districts, in swampy coastal areas, moderately common, also known from south-eastern Darling Downs district.

3. *Rhynchospora rubra* (Lour.) Makino

Schoenus ruber Lour.; *Rhynchospora wallichiana* Kunth

Perennial; stems tufted, slender, 15–70 cm tall, 1–2 mm thick. Leaves mostly basal, with

1 or 2 cauline leaves towards base of stem, keeled, margin scabrous, 2–3 mm wide. Inflorescences dense globose clusters of spikelets 1–2 cm diameter, involucre bracts 4–6, spreading, up to 6 cm long, finally reflexed; spikelets reddish brown, narrowly ovate to ovate in outline, compressed, acuminate, 5–8 mm long; glumes chartaceous, distichous, keeled; hypogynous bristles 3–6, antrorsely scabrous, becoming plumose towards base, shorter than nut; stylar base shortly pyramidal, *ca* $\frac{1}{3}$ as wide as and $\frac{1}{3}$ as long as nut. Nuts obovate to orbicular in outline, laterally compressed and biconvex, margin ribbed and scabrous. **Fig. 51K.**

Widespread in Moreton and Wide Bay districts, in swampy coastal areas.

4. *Rhynchospora heterochaeta* S. T. Blake

Annual; stems solitary or tufted, slender, up to 30 cm tall, *ca* 1 mm thick. Leaves mostly basal with 1 or 2 cauline leaves towards base of stem, mainly flat, up to 3.5 mm wide. Inflorescences terminal dense globose clusters of spikelets 1.2–2 cm diameter, involucre bracts 4–8; spikelets golden brown, ellipsoid-ovoid, acute, 8–10 mm long; hypogynous bristles 6, antrorsely barbed, glabrous towards base, not plumose; stylar base obloid-conical, antrorsely barbed, nearly as long as nut and *ca* $\frac{1}{2}$ as wide as nut. Nuts oblong-obovate in outline, dorsiventrally compressed, edges obtuse, hispidulous towards apex. **Fig. 51M.**

Wide Bay district, in sandy often swampy areas, also known from a single record in Moreton district.

25. *SCLERIA* Bergius

Perennials or annuals, monoecious or dioecious herbs; stems solitary or tufted, triquetrous. Leaves linear, sheaths closed and clasping stems, sometimes winged, often with prominent contraligule opposite base of blade. Inflorescences paniculate, with terminal partial panicle and usually 1 or more lateral ones; spikelets mostly unisexual, occasionally bisexual, female spikelets solitary, male spikelets usually several; hypogynous scales and bristles absent; male flowers with 1–3 stamens; female flowers with slender caducous style, base often persistent on nut, stigmatic branches 3. Nuts globular to ovoid, rounded to obscurely trigonous, borne on persistent 3-lobed disc.

About 200 species worldwide, mainly pantropical; 24 species Australia; 6 species south-eastern Queensland.

- | | | |
|--|-------------------------------|---|
| 1. Plants with either all male or all female spikelets | 1. <i>S. sphacelata</i> | 2 |
| Plants with male and female spikelets | | |
| 2. Nuts hairy; perennials with rhizomes | | 3 |
| Nuts glabrous; tufted annuals | | 4 |
| 3. Leaf sheaths winged; nuts <i>ca</i> as long as glumes, scarcely beaked | 2. <i>S. levis</i> | |
| Leaf sheaths not winged; nuts shorter than glumes, beaked | 3. <i>S. mackaviensis</i> | |
| 4. Disc lobes at base of nuts ending abruptly in short erect subulate points | 4. <i>S. tricuspidata</i> | 5 |
| Disc lobes at base of nuts rounded and not ending in subulate points | | |
| 5. Nuts \pm globose, smooth to tuberculate; discs densely cellular-glandular, lobes obtuse | 5. <i>S. rugosa</i> | |
| Nuts ellipsoid-cylindrical with nearly parrallel sides; discs not cellular-glandular, scarcely lobed | 6. <i>S. novae-hollandiae</i> | |

1. *Scleria sphacelata* F. Muell.

Perennial, dioecious; stems 30–100 cm tall. Leaves long, linear, margin and veins scabrid, 2–6 mm wide; sheaths not winged. Inflorescences narrow, with several small clusters of spikelets towards end of stem, lower distant and pedunculate, clusters subtended by leaf-like bracts; male spikelets with several flowers, female spikelets 1-flowered. Nuts white, globular, tuberculate, pubescent, shortly beaked; disc lobes broad, obtuse. **Fig. 52B.**

Widespread in the region, often close to rainforest.



Fig. 51 CYPERACEAE — A–F *Gahnia* spp. — A *G. insignis*, inflorescence x 1; B *G. aspera*, inflorescence x 1; C *G. subaequiglumis*, spikelet x 4; D *G. sieberiana*, spikelet x 6; E *G. clarkei*, spikelet x 6; F *G. melanocarpa*, nut with filaments x 6; G–K *Caustis* spp. G₁–G₂ *C. blakei*, G₁ part of inflorescence x 1, G₂ nut x 6; H₁–H₂ *C. flexuosa*, H₁ part of inflorescence x 1, H₂ nut x 6; I *C. pentandra*, part of inflorescence x 1; J *C. recurvata*, part of inflorescence x 1; K–N *Rhynchospora* spp. — K₁–K₂ *R. rubra*, K₁ part of inflorescence x 1, K₂ nut with hypogynous bristles x 12; L₁–L₂ *R. corymbosa*, L₁ part of inflorescence x 1/2, L₂ nut x 6; M *R. heterochaeta*, nut with hypogynous bristles x 8; N₁–N₂ *R. brownii*, N₁ part of inflorescence x 1, N₂ nut x 6; O₁–O₂ *Cyathochaeta diandra*, O₁ spikelet x 4, O₂ nut x 4.

2. *Scleria levis* Retz.*Scleria hebecarpa* Nees

Perennial, monoecious; stems 30–90 cm tall. Leaves equally distributed along stem, 3–9 mm wide, sheaths winged. Inflorescences narrow, consisting of terminal partial panicle 5–12 cm long, and 1 or 2 smaller lateral ones below on long peduncles, partial panicles subtended by leaf-like bracts; spikelets in clusters of 2–4, males oblong in outline, female ovate. Nuts white, ovoid, *ca* as long as glumes, scarcely beaked, smooth or very slightly transversely rugulose, pubescent; disc lobes acute, often bidentate at tip. **Fig. 52E.**

Moreton and Wide Bay districts, in woodlands and around edges of swamps near the coast.

3. *Scleria mackaviensis* Boeckl.

Perennial, monoecious; stems tufted, 20–60 cm tall. Leaves long and linear, 1–2 mm wide, scabrid; sheaths not winged. Inflorescences narrow, consisting of 1 or 2 terminal and 1 or 2 distant small shortly peduncled clusters of spikelets, each cluster *ca* 1 cm long and subtended by long leaf-like bracts; spikelets with male and female flowers or male flowers. Nuts white, subglobular, shorter than glumes, obscurely trigonous, rugulose, slightly pubescent, with long cylindrical beak; disc lobes broad, obtuse. **Fig. 52F.**

Widespread in the region, usually in damp places in open woodland.

4. *Scleria tricuspidata* S. T. Blake

Tufted annual, monoecious; stems 20–60 cm tall. Leaves grass-like, 2–4 mm wide, scabrous. Inflorescences narrow, with 3–5 remote partial panicles subtended by leaf-like bracts, terminal panicle 2–3 cm long, lower ones smaller on long peduncles; spikelets pedicellate, male spikelets oblong-linear in outline, 3–4 mm long, female spikelets on shorter pedicels than males, 4.5–5 mm long. Nuts dull white, ellipsoid-obloid, obtusely trigonous, shorter than glumes, rugulose, tuberculate towards top, glabrous, beaked; disc shallowly lobed, lobes ending abruptly in short erect subulate points. **Fig. 52A.**

Widespread in damp places in Moreton district; common.

5. *Scleria rugosa* R. Br.

Tufted annual, monoecious; stems 5–40 cm tall. Leaves grass-like, 2–4 mm wide, glabrous to pubescent. Inflorescences narrow, with terminal partial panicle and 1–3 fascicles of partial panicles below; male spikelets on thick pedicels, female spikelet sessile. Nuts white, globose, shorter than glumes, smooth to tuberculate in upper part, glabrous, beaked; disc densely cellular-glandular, very shallowly lobed. **Fig. 52C.**

Widespread in near coastal parts of Moreton and Wide Bay districts, in damp places.

6. *Scleria novae-hollandiae* Boeckl.

Tufted annual, monoecious; stems 24–45 cm tall. Leaves grass-like, margin scabrid, 2–4 mm wide. Inflorescences narrow, with 2–4 remote partial panicles subtended by long leaf-like bracts, terminal longer than lower ones; male spikelets pedicellate, female spikelet sessile, sometimes with male flower beside it. Nuts greyish white, ellipsoid-cylindrical with nearly parallel sides, obtusely trigonous, smooth to shallowly pitted, glabrous, slightly beaked; disc with short very broadly rounded lobes. **Fig. 52D.**

Eastern Moreton district, in damp places; not common.

26. CAREX L.

Perennial herbs; stems usually 3-angular. Leaves flat. Inflorescences spikes, sometimes paniculate, with male and or female flowers, bracts leaf-like, long, rarely absent or glume-like; glumes imbricate all around rachis; a bristle, the vestigial remains of spikelet rachis present or absent; female flowers enclosed in membranous or corky flask-shaped utricle; male flowers usually in upper part of inflorescence; stamens usually 3; styles 2–3-fid, emerging from utricle. Nuts compressed, plano-convex or trigonous, enclosed in persistent utricle.

About 1500 species worldwide; *ca* 46 species Australia; 15 species south-eastern Queensland.

mm wide. Inflorescences with 2–6 cylindrical pedunculate spikes close together at end of stem; spikes 3–6 cm \times 0.8–1 cm, becoming pendulous, terminal spike male, lower spikes female; glumes with scabrid awns up to 3 mm long. Utricles ovoid-ellipsoid, 5–6 mm long, tapering into long beak. **Fig. 52G.**

Widespread in coastal parts of Moreton and Wide Bay districts, on creek banks and in swamps.

3. *Carex hubbardii* Nelm.

Carex longifolia auct. non Tuckerman, F. M. Bailey

Stems tufted, slender, 60–90 cm tall, smooth. Leaves 2–4 mm wide. Inflorescences with fascicles of 1–5 spikes at nodes on erect stem, pedunculate; spikes 3–6 cm \times 0.3–0.4 cm, male flowers on upper portion and female flowers on lower portion; glumes white with green midvein, obtuse, aristate. Utricles obloid-ellipsoid, trigonous, 5–6 mm long, several-nerved, hispid, with long beak. **Fig. 52H.**

Moreton, Darling Downs and Wide Bay districts, in rainforest of mountainous regions.

4. *Carex pumila* Thunb.

STRAND SEDGE

Herb with long creeping rhizome; stems solitary, 10–25 cm long, smooth, mainly hidden by long leaf sheaths. Leaves 2–3.5 mm wide. Inflorescences with 2–6 spikes; spikes 2–2.5 cm \times ca 1 cm, sessile or lower very shortly pedunculate, upper 1–3 spikes male and linear, lower female and obloid-cylindrical; glumes at anthesis brown with distinct light coloured keel, ovate. Utricles light coloured with occasional red splashes, ovoid, swollen, 5–8 mm long, with corky appearance, tapering into long beak. **Fig. 52L.**

Coastal sand dunes of Moreton and Wide Bay districts.

5. *Carex breviculmis* R. Br.

Stems densely tufted, 6–20 cm tall, scabrous. Leaves 2–4 mm wide. Inflorescences with 2–5 subsessile spikes, close or lower somewhat distant, spikes 2–3 cm long, uppermost spike male, lower female with occasional male flowers at tip; glumes membranous, males obtuse, females keeled and awned. Utricles ovoid, 2–3 mm long, many-nerved, pubescent with long conical beak. **Fig. 52K.**

Widespread in Moreton, Darling Downs and Wide Bay districts, in forests and pasture land.

6. *Carex neurochlamys* F. Muell.

Carex maculata F. Boott

Stems tufted, 20–40 cm tall, smooth. Leaves 2–8 mm wide. Inflorescences consisting of several spikes; spikes cylindrical, 1.5–3 cm \times ca 0.3 cm, 3–4 upper spikes sessile, upper spike male, others with male flowers on upper portion and female below, lower 2–4 spikes female, distant from others and becoming pedunculate; glumes brown with green midvein, oblong-ovate, obtuse, slightly mucronate. Utricles dark brown when mature, ovoid, ca 3 mm long, many-nerved, papillose, very shortly beaked. **Fig. 52O.**

Widespread in Moreton and Wide Bay districts, in swamps and wet places.

7. *Carex brunnea* Thunb.

Carex gracilis R. Br.

Stems densely tufted, 30–80 cm tall, scabrous. Leaves 2–4 mm wide. Inflorescences with several fascicles of 2–5 shortly pedunculate obloid spikes each 1.5–3 cm long, lowest fascicle somewhat distant; glumes brown with green keel, ovate or narrowly ovate, acute. Utricles flattened, ovate in outline, 3–4 mm long, many-nerved, pubescent, with long beak. **Fig. 52U.**

Widespread in Moreton, Darling Downs and Wide Bay districts, in rainforest.

8. *Carex lobeleps* F. Muell.

Stems tufted, 30–60 cm tall, scabrous. Leaves up to 6 mm wide. Inflorescences with 4–6 long-peduncled cylindrical spikes up to 6 cm \times 0.5 cm, uppermost spike male, lower ones female with occasional male flowers at tip; glumes brown with green keel, obtuse, produced into short point. Utricles flattened, ovate in outline, ca 3 mm long, scarcely beaked. **Fig. 52I.**

Known from near Wallangarra in Darling Downs district.

9. *Carex appressa* R. Br.

TALL SEDGE

Carex paniculata auct. non L., Benth.

Stems densely tufted, up to 1.2 m tall, scabrous in upper part. Leaves 2–4 mm wide. Inflorescences narrow spike-like racemes or panicles, 8–25 cm \times 0.5–1 cm, bracts sometimes absent; upper flowers male, lower female; glumes membranous, ovate, acute. Utricles flattened, ovate in outline, 2.5–3.5 mm long, angles and beak scabrid. **Fig. 52M.**

Widespread throughout the region, in damp places.

10. *Carex declinata* F. Boott*Carex paniculata* auct. non L., Benth.

Stems densely tufted, up to 1.2 m tall, scabrous in upper part. Leaves 2–4 mm wide. Inflorescences narrow spike-like racemes or panicles, 8–25 cm \times 0.5–1 cm, bracts glume-like or absent; upper flowers male, lower female; glumes membranous, ovate, acute. Utricles plano-convex, 4–6 mm long, angles and beak not scabrous. **Fig. 52J.**

Widespread in damp places near rainforest.

11. *Carex inversa* R. Br.

KNOB SEDGE

Stems densely tufted, 10–45 cm tall, smooth. Leaves 0.75–2 mm wide. Inflorescences with 2–5 sessile spikes forming terminal cluster, 1–3 cm long, female flowers uppermost in each spike and male flowers below or absent altogether or occasionally few male flowers at tip; glumes thin and almost hyaline with green keel. Utricles flattened, ovate or obovate in outline, *ca* 3 mm long, several-nerved, tapering into ciliate-edged beak. **Fig. 52R.**

Widespread in the Moreton, Darling Downs and Burnett districts, in pasture land and open forest.

12. *Carex lophocarpa* C. B. Clarke

Stems densely tufted, 40–75 cm tall, smooth. Leaves 2–4 mm wide. Inflorescences with 2–5 sessile spikes forming terminal cluster 2–4 cm long; female flowers uppermost in each spike, male flowers below or absent; glumes greenish white with green keel, acuminate. Utricles flattened, ovate in outline, 4.25–5 mm long, several-nerved, conspicuously transversely wrinkled, tapering into ciliate edged beak *ca* as long as body of utricle. **Fig. 52S.**

Widespread in Moreton, Darling Downs and Burnett Districts; not common.

13. *Carex rhytidocarpa* Nelm

Stems densely tufted, 15–45 cm tall, smooth. Leaves 1–3 mm wide. Inflorescences with 2–5 sessile spikes forming terminal clusters 1–2 cm long; female flowers uppermost in each spike, male flowers below or absent; glumes greenish white with green keel, acuminate. Utricles flattened, ovate in outline, *ca* 3 mm long, several-nerved, conspicuously transversely wrinkled, tapering into ciliate edged beak shorter than body of utricle. **Fig. 52Q.**

Widespread in Darling Downs district, often in damp depressions on heavy clay soils, also known from Burnett district.

14. *Carex polyantha* F. Muell.*Carex acuta* auct. non L.

Stems tufted, up to 90 cm tall, smooth. Leaves 3–5 mm wide. Inflorescences with 5–8 sessile cylindrical distant spikes, upper 1–3 spikes male, lower spikes female, mature female spikes 5–12 cm \times *ca* 0.4 cm; glumes dark with light coloured midvein, oblong-ovate or linear. Utricles flattened, ovate to obovate in outline, 2.5–3 mm long, nerveless or few very faint nerves, with very short beak. **Fig. 52P.**

Moreton and Darling Downs districts, on creek banks and in swampy areas.

15. *Carex gaudichaudiana* Kunth*Carex vulgaris* Fries var. *gaudichaudiana* (Kunth) F. Boott

Stems tufted, 60–90 cm tall, scabrous. Leaves 2–4 mm wide. Inflorescences with 3–8 sessile cylindrical somewhat distant spikes, each 1.5–6 cm \times *ca* 0.5 cm, upper 1 or 2 male, lower female with occasional male flowers at tip; glumes very dark brown, often



Fig. 52 CYPERACEAE — A–F *Scleria* spp. — A₁–A₂ *S. tricuspidata*, A₁ habit x ½, A₂ nut x 12; B *S. sphacelata*, spikelet x 6; C *S. rugosa*, nut x 12; D *S. novae-hollandiae*, nut x 12; E₁–E₂ *S. levis*, E₁ portion of winged stem x 1, E₂ inflorescence x 1; F *S. mackaviensis*, nut x 12; G–U *Carex* spp. — G *C. fascicularis*, part of inflorescence showing male and female sections x 1; H *C. hubbardii*, inflorescence x 1; I *C. lobolepis*, spike x 1; J *C. declinata*, utricle x 6; K *C. breviculmis*, utricle x 8; L *C. pumila*, inflorescence showing male and female sections x 1; M₁–M₂ *C. appressa*, M₁ part of spike x 1, M₂ utricle x 6; N *C. horsfieldii*, part of inflorescence x 1; O *C. neurochlamys*, utricle x 12 with enlargement of surface x 50; P *C. polyantha*, utricle x 12; Q *C. rhytidocarpa*, utricle x 12; R *C. inversa*, utricle x 12; S *C. lophocarpa*, utricle x 12; T₁–T₂ *C. gaudichaudiana*, T₁ spike showing male and female portions x 1, T₂ utricle x 8; U *C. brunnea*, utricle x 8.

with green keel, narrowly ovate, obtuse or mucronate. Utricles very flat, ovate to elliptic in outline, 3–4 mm long, nerves 4–6, faint, beak very short. **Fig. 52T.**

Southern Moreton district and south-eastern Darling Downs district in swampy areas.

194. ZINGIBERACEAE

Perennial herbs; rhizomes horizontal, tuberous. Leaves basal or cauline and distichous, sheathing at base, ligulate, sessile or stalked on sheath, usually with numerous closely parallel pinnate nerves diverging obliquely from midrib. Flowers solitary or in variable inflorescences, mostly bisexual and zygomorphic; calyx segments 3, united into tube; corolla segments 3, \pm united, often showy, one usually larger than others; stamen 1, labellum formed by petaloid staminodes, sometimes other petaloid staminodes also present; ovary inferior. Fruits indehiscent or loculicidally 3-valved.

About 45 genera with 700 species mainly Indo-malaysian region; *ca* 9 genera with 17 species Australia; 2 genera with 4 species south-eastern Queensland.

- | | | | | | | |
|---|---|---|---|---|---|---------------------|
| 1. Staminodes short, linear, at base of style | . | . | . | . | . | 1. <i>Alpinia</i> |
| Staminodes large, conspicuous, petal-like | . | . | . | . | . | 2. <i>Hedychium</i> |

1. ALPINIA Roxb.

Leaves numerous, ligules well developed. Inflorescences terminal on leafy stems, raceme-like, erect or nodding; calyx tubular, 3-lobed, often spathaceous; corolla with cylindrical tube, labellum broad and flat; staminodes 2, short, linear. Fruits indehiscent.

About 250 species, Asia to Polynesia; 5 species endemic in Australia; 2 species south-eastern Queensland.

- | | | | | | |
|---|---|---|---|---|---------------------------|
| 1. Ligules 8 mm or more long; inflorescences 10 cm or more long | . | . | . | . | 1. <i>A. coerulea</i> |
| Ligules <i>ca</i> 3 mm long; inflorescences 8 cm or less long | . | . | . | . | 2. <i>A. arundelliana</i> |

1. *Alpinia coerulea* (R. Br.) Benth. A NATIVE GINGER

Hellenia coerulea R. Br.

Plants up to *ca* 2 m tall. Leaf sheaths with ligule 8 mm or more long; blades oblong to ovate, apex shortly acuminate, 15–40 cm \times 3–6 cm. Inflorescences 10–20 cm long; calyx 8–10 mm long; corolla pale pink, tube 1.2–1.4 cm long, lobes *ca* 8 mm \times *ca* 2 mm; labellum *ca* 10 mm wide. Fruits blue, globular, *ca* 1 cm long, pericarp crustaceous.

Rainforest of the Moreton and Wide Bay districts. Flowers summer. Occasionally cultivated in gardens.

2. *Alpinia arundelliana* (F. M. Bailey) K. Schum. A NATIVE GINGER

Alpinia coerulea var. *arundelliana* F. M. Bailey

Plants up to *ca* 2 m tall. Leaf sheaths with ligule *ca* 3 mm long; blades linear to narrowly ovate, apex attenuate-acuminate, *ca* 15–20 cm \times *ca* 2.5 cm. Inflorescences *ca* 8 cm long; calyx 8–10 mm long; corolla pale pink, tube 1.2–1.4 cm long, lobes *ca* 8 mm \times *ca* 2 mm; labellum *ca* 10 mm wide. Fruits blue, ovoid, *ca* 1 cm long, pericarp crustaceous.

Rainforest of the Moreton and Wide Bay districts. Flowers summer.

2. HEDYCHIUM Koenig

Leaves large, ligules well developed. Inflorescences terminal on leafy stems, spicate or paniculate, bracts large; calyx cylindrical, 3-toothed or 3-lobed; corolla tubular, segments linear; staminodes petaloid.

About 50 species, Madagascar and Asia, several species cultivated throughout the world; 2 species naturalized Australia, occurring in south-eastern Queensland.

- | | | | | | | |
|--------------------------------------|---|---|---|---|---|---------------------------|
| 1. Flowers yellow with red filaments | . | . | . | . | . | 1. <i>H. gardnerianum</i> |
| Flowers white with white filaments | . | . | . | . | . | 2. <i>H. coronarium</i> |

1. **Hedychium gardnerianum* Sheppard ex Ker-Gawl.

Plants usually 1–2 m tall. Leaves with ligules up to 3.5 cm long; blades elliptic, apex acuminate, 20–60 cm × 8–18 cm, usually sparsely hairy beneath. Inflorescences spikes, ca 20–40 cm or more long; flowers yellow, fragrant, 3–5 cm across; corolla tube ca 3–5 cm long; filaments red, long exserted.

Native of India; cultivated in gardens for its attractive flowers and foliage, apparently naturalized in the Moreton district, around the edges of rainforest around Mt Tamborine and Springbrook. Flowers summer.

2. **Hedychium coronarium* Koenig

Plants usually 1–2 m tall. Leaves with ligules up to ca 2 cm long; blades oblong-ovate or narrowly ovate, apex acuminate, 20–60 cm × 5–15 cm, usually sparsely hairy below. Inflorescences spikes, up to ca 30 cm long; flowers white, rarely cream, fragrant, ca 4–8 cm across; corolla tube ca 5–7 cm long; filaments white.

Native of India to Malaya; cultivated in gardens for its attractive flowers and foliage, apparently naturalized in a few places in the Moreton district. Flowers summer.

195. CANNACEAE

Large perennial usually rhizomatous herbs with unbranched aerial stems. Leaves alternate, with open tubular sheathing bases. Inflorescences terminal, spicate or branched, each branch with a 2-keeled bract at base; flowers 1 or 2 together subtended by bract and sometimes bracteoles, showy, zygomorphic, bisexual; sepals 3, free, persistent; petals 3, often unequal, usually basally connate and adnate to androecium and style to form tube; stamen 1, filament petaloid, anther attached at margin of filament, 1-locular; staminodes 1–4, rarely 5, petaloid, inner staminode usually curled and forming a staminodal lip or labellum, outer staminodes if present usually larger and erect; ovary inferior, 3-locular, densely papillose, style flat, stigma terminal. Fruits capsules, loculicidally 3-valved, rarely indehiscent.

1 genus with ca 50 species, mainly tropical and subtropical Americas, with a number of artificial hybrids in cultivation; 1 species and 2 horticultural hybrids naturalized Australia, all 3 in south-eastern Queensland.

1. CANNA L.

Characters of the family.

- | | | | | | |
|---|---|---|---|--------------------------|---|
| 1. Floral tube 2–5 cm long; petals reflexed after first day | . | . | . | 1. <i>C. × orchiodes</i> | |
| Floral tube less than 1.5 cm long; petals not reflexed | . | . | . | . | 2 |
| 2. Outer staminodes 1.5 cm or more broad | . | . | . | 2. <i>C. × generalis</i> | |
| Outer staminodes less than 1.5 cm broad | . | . | . | 3. <i>C. indica</i> | |

1. **Canna × orchiodes* L. H. Bailey

Rhizomatous herb up to 1.5 m tall. Leaf blades elliptic, apex acute to acuminate, base narrowed to sheath, margin entire, up to ca 45 cm × ca 25 cm, glabrous. Floral bracts ca 1–2 cm long; sepals ca 2 cm long; corolla tube ca 2–5 cm long, lobes ca 4.5–6 cm long, reflexed after first day; outer staminodes 3, yellow to gold with dark markings, up to ca 12 cm × ca 6 cm, inner staminode sometimes darker in colour than outer staminodes, up to ca 12 cm × ca 6 cm, usually not recurved; petaloid filament ca 3.5 cm broad, usually not recurved, anther ca 8 mm long; ovary sterile, style ca 8 mm broad.

A hybrid of horticultural origin, cultivated for its showy flowers; naturalized in a few places in eastern parts of the region, usually in disturbed damp areas. Flowers spring to autumn. It does not produce viable seed, but reproduces vegetatively from its rhizomes and is probably spread to new areas when people dump garden refuse containing rhizomatous material.

2. **Canna × generalis* L. H. Bailey

Rhizomatous herb up to ca 2 m tall. Leaf blades elliptic, apex acute to acuminate, base narrowed to sheath, margin entire, up to 45 cm × ca 25 cm, glabrous. Floral bracts ca 1.2 cm long; sepals ca 2 cm long; corolla tube less than 1.5 cm long, often only 0.5 cm

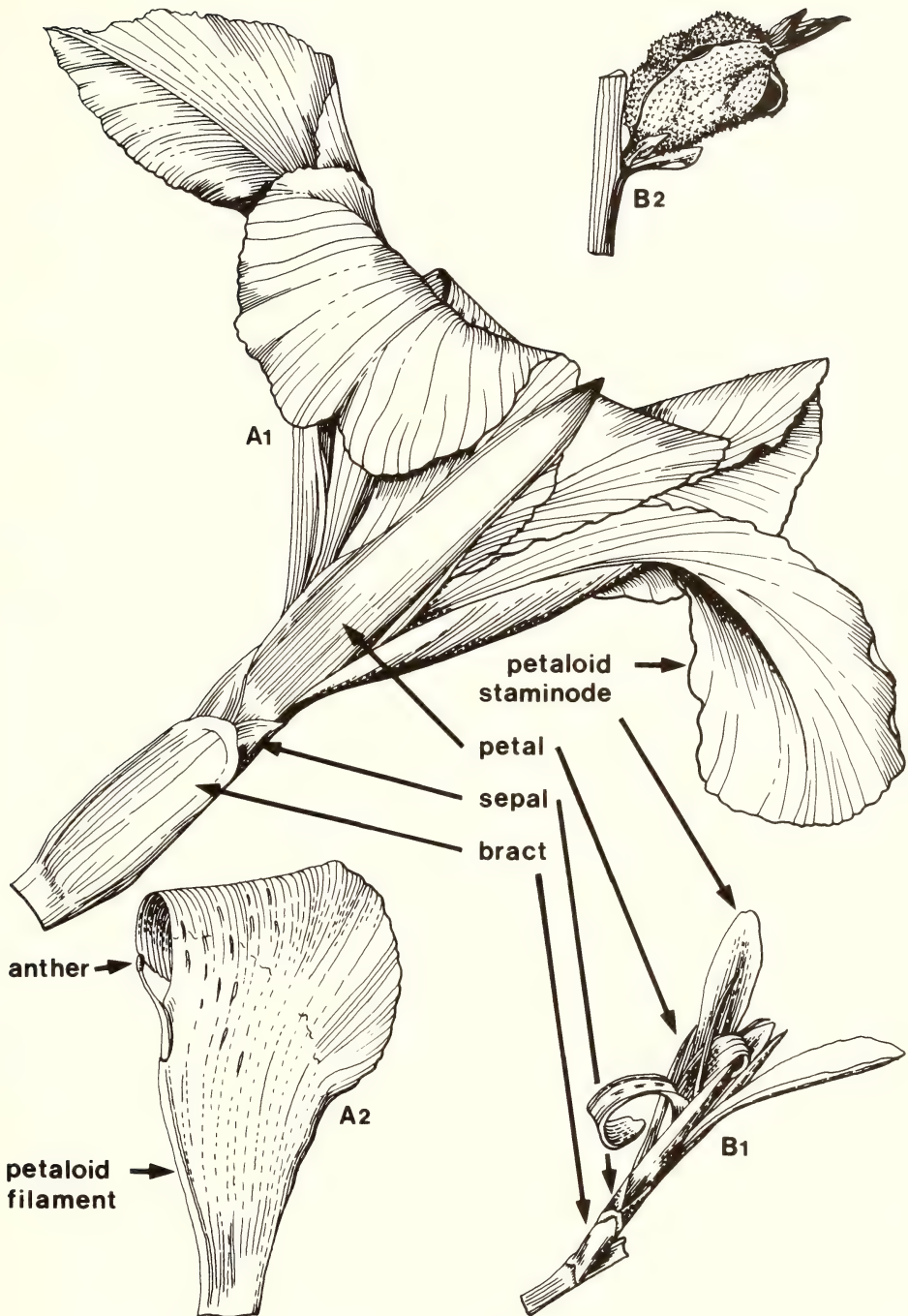


Fig. 53 CANNACEAE — A-B *Canna* spp. — A₁-A₂ *C. × generalis*, A₁ flower x 1, A₂ stamen x 1; B₁-B₂ *C. indica*, B₁ flower x 1, B₂ fruit x 1.

long, lobes 4–5 cm long, erect, margin incurved; outer staminodes 3, white to yellow to red or pink, sometimes with markings in other colours, up to *ca* 10 cm × up to *ca* 5.5 cm, inner staminode sometimes darker in colour than outer staminodes and streaked or blotched with a darker colour, up to *ca* 8 cm × *ca* 3 cm, recurved from apex; petaloid filament *ca* 1.5 cm broad, apex recurved, anther *ca* 1.2 cm long; style *ca* 4 mm wide. Mature fruits 2–3 cm long. **Fig. 53A.**

A hybrid of horticultural origin, cultivated for its showy flowers; naturalized in a few places in eastern parts of the region, usually in disturbed damp areas. Flowers spring to autumn.

3. ****Canna indica* L.**

INDIAN SHOT

Rhizomatous herb up to 2 m tall. Leaf blades elliptic, apex acute to acuminate, base narrowed to sheath, margin entire, up to *ca* 45 cm × *ca* 25 cm, glabrous. Floral bracts *ca* 1 cm long; sepals 1–1.5 cm long; corolla tube up to *ca* 1 cm long, lobes 3.5–4 cm long, sometimes unequal, erect, margin incurved; outer staminodes 3, red or occasionally yellow or red and yellow, up to *ca* 5 cm × *ca* 1.5 cm, often unequal in size, inner staminode red, up to *ca* 4.5 cm × *ca* 0.8 cm, apex recurved; petaloid filament *ca* 3–4 mm wide, anther *ca* 1 cm long; style *ca* 4 mm broad. Mature fruits 2–3 cm long; seeds black or dark brown, 5–6 mm long. **Fig. 53B.**

Native of South America; probably introduced as a garden ornamental, naturalized in eastern parts of the region.

196. ORCHIDACEAE

Perennial, terrestrial, epiphytic or saprophytic herbs with rhizomes or tuberous roots or rootstock; stems leafy or scapose, frequently thickened basally into pseudobulbs and bearing aerial assimilating roots. Leaves undivided, alternate, often distichous, rarely opposite, sometimes all reduced to scales, often fleshy, sheathing at base, sheath nearly always closed and encircling stem. Inflorescences spicate, racemose or paniculate or flowers solitary; flowers bracteate, bisexual, or very rarely polygamous or monoecious, zygomorphic; perianth epigynous, composed of 6 petaloid segments in 2 whorls or the outer whorl calyx-like, free or variously connate in each whorl; outer segments (“sepals”) imbricate or subvalvate; middle segments (“petals”) of each whorl generally different in size and often colour from laterals, especially the middle “petal” often extremely complicated in structure and called the labellum, labellum often abaxial, by virtue of ovary being twisted through 180°, often labellum or rarely dorsal sepal prolonged into a spur, often containing nectar or nectar-secreting tissue; stamens 2 or 1, anther(s) 2-locular, introrse, opening by a slit lengthwise, pollen granular or agglutinated into mealy, waxy or bony masses (pollinia), at one end pollinium may be extended into sterile part (caudicle), pollinia free or ± loosely united; ovary inferior, 1-locular with 3 parietal placentas or very rarely 3-locular with axile placentas, often produced apically into special structure (column), stigmas 3, fertile, or more often lateral 2 fertile and the third a sterile outgrowth (rostellum), part of rostellum sometimes modified into viscid disc (viscidium) to which pollinia are attached, ovules very numerous, minute, anatropous. Fruits usually capsules, mostly opening laterally by 3 or 6 longitudinal slits or indehiscent; seeds usually very numerous, minute, often drawn out at each end or rarely winged, without endosperm, embryo not differentiated. **Fig. 54.**

About 850 genera with *ca* 25,000 species cosmopolitan, main centres of distribution Indo-Malaya and tropical America; *ca* 108 genera with *ca* 700 species Australia; 48 genera with 197 species south-eastern Queensland.

1. Terrestrial plants	2
Epiphytic or lithophytic plants	41
2. Plants completely subterranean, flowers in a capitulum	1. <i>Rhizanthella</i>
Plants not completely subterranean, inflorescences extending well above the ground	3
3. Plants without leaves at flowering time	4
Plants with leaves at flowering time	12

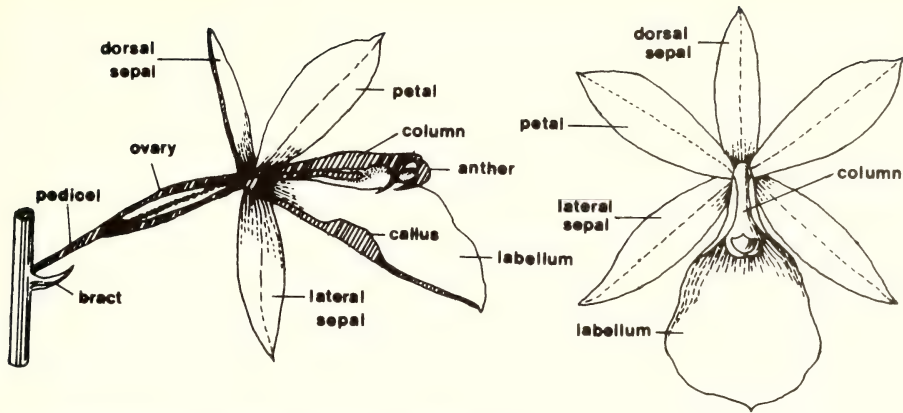


Fig. 54 Diagrammatic representation of an Orchidaceae flower.

4. Climbing (vine-like) plants	5
Plants not climbing	6
5. Aerial roots not branched; bracts not foliaceous; labellum with numerous transverse ridges	2. <i>Erythrorchis</i>
Aerial roots branched; bracts foliaceous; labellum with densely verrucose disc	3. <i>Pseudovanilla</i>
6. Labellum spurred	7
Labellum not spurred though it may be peltate	8
7. Rachis of inflorescences strongly recurved or hooked; flowers \pm tubular	4. <i>Epipogium</i>
Rachis of inflorescences straight, erect; flowers never tubular	5. <i>Eulophia</i>
8. Sepals and petals joined so that flowers are \pm tubular	6. <i>Gastrodia</i>
Sepals and petals free	9
9. Labellum sessile on base of column, immoveable	7. <i>Dipodium</i>
Labellum articulate by a highly moveable claw on the column foot	10
10. Labellum with large insect-like callus and gland-tipped cilia	8. <i>Arthrochilus</i>
Labellum smooth or tuberculate, but without a callus and cilia	11
11. Labellum smooth, shining; lateral sepals and labellum inserted at base of column	9. <i>Caleana</i>
Labellum tuberculate; lateral sepals and labellum inserted at end of column foot	10. <i>Paracaleana</i>
12. Plants arising from slender above-ground rhizomes, or from rather large bunched pseudobulbs or fleshy stems over 3 cm long which are at least partly above ground	13
Plants arising from small subterranean tuberoïds or fleshy roots	20
13. Plants arising from slender above-ground rhizomes, leaf-bearing stem merely the upright extension of rhizome, losing its leaves when it falls over and then becomes the rhizome for next year's growth	14
Plants arising from rather large bunched pseudobulbs or fleshy stems over 3 cm long which are usually at least partly above ground	15
14. Sepals connate for half their length	11. <i>Cheirostylis</i>
Sepals not connate	12. <i>Zeuxine</i>
15. Flowers over 4 cm diameter	13. <i>Phaius</i>
Flowers less than 3 cm diameter	16

16. Rachis of inflorescences bent through 180° when flowers approach maturity	14. <i>Geodorum</i>	17
Rachis of inflorescences ± erect		
17. Flowers reversed (labellum above column)	15. <i>Malaxis</i>	18
Flowers not reversed (labellum below column)		
18. Labellum not spurred, free from column	16. <i>Liparis</i>	19
Labellum spurred at base		
19. Labellum connate into a tube with column, apex deeply lobed	17. <i>Calanthe</i>	
Labellum not connate into a tube with column, apex entire	5. <i>Eulophia</i>	
20. Leaves hairy, solitary, often small		21
Leaves glabrous		22
21. Labellum usually shortly clawed, often 3-lobed, disc and/or midlobe with calli, margin fringed or entire	18. <i>Caladenia</i>	
Labellum sessile, not lobed, not fringed, disc with a large double headed appendage or callus and 2 papillose areas at base	19. <i>Glossodia</i>	
22. Leaves solitary, hollow-terete, inflorescence developing inside leaf and forcing its way through the leaf at varying distances from base		23
Leaves not hollow-terete, not as above		25
23. Flowers not reversed (labellum below column)	20. <i>Microtis</i>	24
Flowers reversed (labellum above column)		
24. Labellum fixed	21. <i>Prasophyllum</i>	
Labellum articulate on a column foot	22. <i>Genoplesium</i>	
25. Flowers reversed (labellum above column)		26
Flowers not reversed (labellum below column)		29
26. Labellum immoveable, not on a slender sensitive claw	23. <i>Cryptostylis</i>	
Labellum articulate on a slender sensitive claw		27
27. Labellum with large insect-like callus and gland-tipped cilia	8. <i>Arthrochilus</i>	
Labellum smooth or tuberculate, but without a callus and cilia		28
28. Labellum smooth, shining; lateral sepals and labellum inserted at base of column	9. <i>Caleana</i>	
Labellum tuberculate; lateral sepals and labellum inserted at end of column foot	10. <i>Paracaleana</i>	
29. Labellum not or only slightly differentiated from paired sepals and petals	24. <i>Thelymitra</i>	30
Labellum distinctly differentiated from petals and sepals		
30. Flowers dominated by comparatively large galeate dorsal sepal		31
Flowers without large galeate dorsal sepal		32
31. Flowers solitary on very short stems; leaf basal, solitary, thin, almost as broad as long	25. <i>Corybas</i>	
Flowers (1-)few-many on long stems; leaves in a basal rosette or cauline on flowering stems	26. <i>Pterostylis</i>	
32. Dorsal sepal and lateral petals together forming a hood, or dorsal sepal galeate, small	27. <i>Habenaria</i>	33
Sepals and petals not as above		
33. Labellum 3-lobed		34
Labellum 1-lobed		35
34. Dorsal sepal erect or reflexed; petals broad, on long linear claws	28. <i>Diuris</i>	
Dorsal sepal usually incurved; petals narrow, not on claws	29. <i>Lyperanthus</i>	

35. Leaves in an opposing pair, \pm prostrate; labellum with insectiform calli Leaves solitary, basal or cauline; labellum without insectiform calli	30. <i>Chiloglottis</i>	36
36. Labellum without hairs on disc or margin, sometimes with 1 or 2 large basal calli Labellum covered with simple or glandular hairs		37 40
37. Labellum without calli Labellum with calli	24. <i>Thelymitra</i>	38
38. Flowers arranged in a distinct spiral; labellum margins fringed or crisped Flowers not spirally arranged; labellum margins entire or undulate	31. <i>Spiranthes</i>	39
39. Leaf held above ground on a petiole; sepals longer than petals, tips caudate Leaf ground-hugging; sepals and petals of similar length, tips never caudate	32. <i>Acianthus</i> 33. <i>Cyrtostylis</i>	
40. Labellum glandular hairy, hairs less than 1 mm long Labellum usually simple hairy, hairs more than 2 mm long	34. <i>Eriochilus</i> 35. <i>Calochilus</i>	
41. Stems slender, elongated, cane-like Stems turgid or swollen or absent, never elongated and cane-like	36. <i>Epidendrum</i>	42
42. Perianth segments more than 5 mm long Perianth segments less than 5 mm long		43 50
43. Pollinia 2 Pollinia 4 or appearing so	37. <i>Cymbidium</i>	44
44. Labellum hinged to column foot Labellum not hinged to column foot		45 47
45. Disc with large \pm bifid appendages attached near orifice of spur Disc without appendages	38. <i>Parasarcocochilus</i>	46
46. Sepals and petals \pm filiform; roots raspy Sepals and petals not filiform; roots not raspy	39. <i>Rhinerrhiza</i> 40. <i>Sarcocochilus</i>	
47. Labellum spur hollow with a hirsute finger-like callus arising from anterior wall and directed towards the apex Labellum not spurred, or if indistinctly spurred then without a callus	41. <i>Plectorrhiza</i>	48
48. All sepals fused for <i>ca</i> half their length to form a basally swollen tube Segments free or at most 2 lateral sepals basally fused to form a mentum	11. <i>Cheirostylis</i>	49
49. Inflorescences terminating each annual successive segment of main axis Inflorescences produced on special lateral axes, each successive segment of main axis stopping short at the end of its growing period but not terminating in an inflorescence	16. <i>Liparis</i> 42. <i>Dendrobium</i>	
50. Leafless and almost stemless plants; pollinia all free Plants with leaves and stems or pseudobulbs; pollinia in 2 pairs	43. <i>Taeniophyllum</i>	51
51. Inflorescences arising from a rhizome or pseudobulb base Inflorescences not arising from a rhizome or base of pseudobulb	44. <i>Bulbophyllum</i>	52
52. Inflorescences terminal Inflorescences axillary		53 54
53. Plants with pseudobulbs; leaves not laterally compressed Plants without pseudobulbs; leaves laterally compressed	16. <i>Liparis</i> 45. <i>Oberonia</i>	

- | | |
|--|---------------------------|
| 54. Labellum hinged to column foot | 55 |
| Labellum immoveably attached to column foot | 56 |
| 55. Labellum disc with rather large \pm bifid appendages attached near orifice of spur | 40. <i>Sarcochilus</i> |
| Labellum disc with erect finger-like appendage from anterior wall of spur | 46. <i>Peristeranthus</i> |
| 56. Labellum spur with hirsute finger-like appendage attached to anterior wall of spur and directed towards its apex | 41. <i>Plectorrhiza</i> |
| Labellum spur not as above | 57 |
| 57. Labellum <i>ca</i> 2 mm long, with a thick transverse ridge between spur and midlobe | 47. <i>Saccolabiopsis</i> |
| Labellum 4–4.5 mm long, without a transverse ridge | 48. <i>Papillilabium</i> |

1. RHIZANTHELLA R. Rogers

Herbaceous subterranean saprophytes with thick white fleshy rootless rhizomes \pm covered with imbricate scaly bracts. Flowers very small, crowded into capitula terminating rhizome; perianth segments shortly united, of unequal lengths; labellum undivided, attached to column foot by a slender claw; column with 2 jointed appendages curving beside the anther; anther obtuse, pollinia granular, extremely fragile; stigma large, ovary large. Capsules indehiscent; seeds sclerotic.

2 species endemic in Australia; 1 species south-eastern Queensland.

1. *Rhizanthella slateri* (Rupp) M. Clements & Cribb

Cryptanthemis slateri Rupp

Rhizome stout, up to 15 cm long, often branched, bracteate, uppermost bracts elongated, fleshy, subtending swollen capitula. Capitula with 15–30 crowded small introrse flowers, flowers initially waxy white but slowly darkening to dull purplish brown with exposure to light; perianth segments with prominent midveins; dorsal sepal ovate, concave, apex acuminate, base broad, 5–8 mm long, lateral sepals ovate, concave, abruptly contracted into long filiform point, 0.8–2 cm long; petals narrowly ovate, apex acuminate, 4–6 mm long; labellum attached by a slender claw *ca* 1 mm long to base of column, dark reddish purple, ovate to \pm cordate, apex acute, up to 3 mm long, thick, fleshy, densely papillose, marginal papillae slightly elongate, margin appearing serrulate; column nearly as long as petals with slightly curved jointed appendage on either side near summit; anther conical, pollinia apparently 2, granular, extremely fragile; stigma large, shield-shaped, ovary irregularly quadrilateral. **Fig. 55A.**

Recorded from Lamington National Park in the McPherson Ra., in eucalypt forest. Flowers spring.

There is some contention over whether ***Rhizanthella*** or ***Cryptanthemis*** is the correct genus for this species, since the other species of ***Rhizanthella*** occurs in Western Australia.

2. ERYTHROCHIS Blume

Leafless terrestrial saprophytes with thick fleshy rhizomes; stems usually few, branching, climbing by means of short unbranched aerial roots; bracts at base of branches small, non-foliaceous. Inflorescences terminal or axillary panicles, subtended by \pm stem-clasping bracts; perianth segments of similar length but petals narrower than sepals; labellum sessile, undivided, unattached to column but embracing it, with numerous transverse parallel ridges on both sides of central ridge and crisped undulate margin; column long, erect, not or only obscurely winged, with short descending foot tapering into thick median ridge of labellum; anther 2-locular, operculate, incumbent, with broad flat or concave dorsal appendage, pollinia 2, deeply 2-lobed, solid, waxy. Capsules long, \pm cylindrical; seeds sclerotic.

About 3 species, south-eastern Asia, Japan, Malaysia, Indonesia, Philippines; 1 species Australia, occurring in south-eastern Queensland.

1. *Erythrorchis cassythoides* (Cunn.) Garay **SMALL CLIMBING ORCHID**
Dendrobium cassythoides Cunn.; *Ledgeria aphylla* F. Muell.; *Galeola cassythoides* (Cunn.) H. G. Reichb.

Stems dark brown to black, up to 6 m long. Inflorescences long pendulous panicles, bracts narrowly ovate, 2–8 mm long, pedicels including ovary 6–10 mm long; flowers pale yellow with greenish purple markings; sepals narrowly elliptic-oblong, laterals slightly falcate, apex obtuse to acute, 1.3–1.8 cm long; petals narrowly oblong, obtuse, 1.2–1.8 cm long; labellum white with transverse bands, 1 cm long, sessile, very broad, initially erect, concave, almost convolute, obscurely 3-lobed, lateral lobes short, erect, entire, midlobe very short, broad, spreading, undulate-crenate, disc with 2 raised longitudinal lines separated by broad pubescent centre ending in transverse callus, midlobe basally pubescent, often bearing undulate calli; anther with large broad convex or almost hood-like dorsal appendage, without caudicles. Capsules cylindrical, *ca* 12 cm × 0.8 cm; seeds globose, winged all round but split up 1 side. **Fig. 55B.**

Scattered throughout the region in eucalypt forest. Flowers spring.

3. **PSEUDOVANILLA** Garay

Leafless terrestrial saprophytes with thick, fleshy rhizomes; stems usually numerous, branching, climbing by means of short branched aerial roots; bracts at base of branches large, foliaceous. Inflorescences terminal or axillary panicles subtended by ± stem-clasping bracts; perianth segments of similar length but petals narrower than sepals; labellum sessile, undivided, unattached to column but embracing it, surface of disc densely verrucose, margin crisped undulate; column long, erect, not or only obscurely winged, footless, forming with base of labellum a short, saccate nectary; anther 2-locular, operculate, incumbent, with broad flat or concave dorsal appendage, pollinia 2, deeply 2-lobed, granular-farinaceous. Capsules long, ± cylindrical; seeds sclerotic.

About 8 species, Moluccas, Fiji, Indonesia, New Guinea; 1 species Australia, occurring in south-eastern Queensland.

1. *Pseudovanilla foliata* (F. Muell.) Garay **GREAT CLIMBING ORCHID**
Ledgeria foliata F. Muell.; *Galeola altissima* F. Muell.; *G. ledgerii* Fitzg.; *G. ledgeriana* F. Muell.; *G. foliata* (F. Muell.) F. Muell.

Stems usually yellowish but sometimes brown or green, up to 15 m long. Inflorescences of long panicles, bracts ± ovate, 2–6 cm × 1.5–5 cm, pedicels including ovary *ca* 1.3 cm long; flowers fragrant, golden yellow with pink and red markings on labellum; sepals elliptic or elliptic-oblong, obtuse or dorsal one acute, 1.5–3.2 cm long; petals narrowly elliptic, obtuse, 1.5–3 cm long; labellum *ca* 2–2.5 cm long, lower half pink with irregular red markings, inrolled, appearing tubular, upper half expanded into pink semicircular lobe with thick blunt yellow calli and crisped contorted yellow margin, disc with 2 high keels, parallel for almost entire length then diverging and quickly converging just before terminating at ± centre of labellum; column *ca* 1–1.3 cm long, projecting forwards; anther very tall, peaked with a broadly bifid appendage; stigma obdeltoid.

Scattered through Moreton and Wide Bay districts in rainforest. Flowers mainly summer.

4. **EPIPOGIUM** Gmelin ex Borkh.

Leafless terrestrial saprophytes with thick fleshy rhizome; stems thick, scaly. Flowers numerous in terminal, often nodding racemes; sepals and petals free, subequal, narrow, erect or spreading, concave, disc with glandular keels; column incurved; anther operculate with terminal appendage, pollinia 2, granular with long caudicles; stigma prominent, ± triangular.

2 species, Eurasia, Africa, Indomalaysia, Australia, Vanuatu; 1 species Australia, occurring in south-eastern Queensland.

1. *Epipogium roseum* (D. Don) Lindl.

Limodorum roseum D. Don; *Galera nutans* Blume; *Ceratopsis rosea* (D. Don) Lindl.; *Podanthera pallida* Wight; *G. rosea* (D. Don) Blume; *Epipogium nutans* (Blume) H. G. Reichb.; *E. japonicum* Makino; *E. tuberosum* Duthie

Brittle, dull pale yellow herb 5–60 cm tall; rhizome tuberous, thick, rootless; stem hollow with few-numerous sheathing bracts 1–2 cm long. Inflorescences nodding until flowers mature when it becomes erect, pedicels including ovary 0.8–1.3 cm long, subtended by broad or narrow, non-sheathing bracts 0.5–1.2 cm long; flowers dull white or sometimes stained with pink; perianth segments usually converging; sepals linear-ovate, 0.7–1.2 cm long; petals very narrowly ovate, 0.6–1 cm long; labellum dotted with dull red spots, *ca* 1–1.2 cm long, deeply concave to \pm enclose column, apex decurved, spur directed backwards towards ovary, 2–4 mm long, margin papillose and crenulate, disc with 2 rows of papillae and at raised apex with 3 additional short rows of papillae; column very broad, curved forward in apical half, 2–2.5 mm long; anther larger than column, anther appendage large, pollinia very large with upturned caudicles. Capsules \pm globose to obovoid, 0.5–0.8 cm long. **Fig. 55C.**

Coastal districts of the region. Flowers late spring–summer.

5. EULOPHIA R. Br.

Terrestrial herbs with large tuberous, often irregular subterranean rhizome. Leaves deciduous, appearing after flowering on a separate stem from the inflorescence, 1–few, slender, grass-like or plicate. Inflorescences terminal on subterranean stem, racemose. Flowers dull coloured, moderately large, opening widely; perianth segments subequal, usually petals smaller than sepals, often lateral sepals longer than dorsal sepal; labellum distinctly or indistinctly 3-lobed, spurred, spur often small, lateral lobes often embracing column; column slender, indistinctly winged; anther apical, rostrate; rostellum small.

200 species, pantropical, particularly Africa and Asia; 5 species Australia; 1 species possibly occurring in south-eastern Queensland.

1. *Eulophia bicallosa* (D. Don) Hunt & Summerh.

Dipodium venosum F. Muell.; *Eulophia venosa* (F. Muell.) H. G. Reichb.

Terrestrial herb with irregularly shaped somewhat flattened tuberous rhizomes up to 10 cm long; leaf stem slender, up to 25 cm long, sheathing bracts 2 or 3, prominent, uppermost largest. Leaf terminal, dark green, very narrowly ovate, acute, base attenuate, 20–40 cm \times 2–2.5 cm, plicate. Racemes up to 60 cm tall, bracts narrowly ovate, acuminate, 1.5–2 cm long, pedicel including ovary 1–3 cm long; flowers few–*ca* 20, pale green or whitish with purple stripes, blotches and spots; dorsal sepal narrowly ovate, erect, acute, 1–1.5 cm \times 0.25–0.35 cm, lateral sepals boat-shaped, widely divergent, apex acute, \pm twisted, base adnate to column foot, 1.3–1.9 cm \times 0.35–0.5 cm; petals obovate, apiculate, spreading, margin often undulate, 1–1.5 cm \times 0.5–0.6 cm; labellum striate or veined with purple, deeply 3-lobed, projected forwards, lateral lobes crescentic, 2–3 mm \times 7–9 mm, midlobe broadly ovate, apex truncate, margin erect, \pm undulate, 6–8 mm \times 7–10 mm, spur \pm conical, *ca* 3 mm long, disc with 2–several indistinct ridges on base of midlobe; column *ca* 5–7 mm long, slender, foot at right angles, 5–7 mm long.

Possibly occurring in northern parts of Wide Bay and Burnett districts, often on sandy soils, typically in open forest. Flowers spring.

6. GASTRODIA R. Br.

Leafless saprophytic herbs, lacking chlorophyll. Inflorescences simple erect racemes with short loosely sheathing scales; flowers reversed, brown and white; sepals and petals united in a 5-lobed tube, gibbous at base under labellum; labellum just shorter than perianth, shortly adnate to it at base along centre, entire or with 2 obtuse auricles at base, oblong, margin undulate, disc with 2 longitudinal raised lines or plates confluent towards apex;

column elongated, apex concave, margin membranous, anther lid-like, pollen granular; stigma on short protuberance at base of column.

20 species, eastern Asia, Indomalaysia to New Zealand; 2 species Australia; 1 species south-eastern Queensland.

1. *Gastrodia sesamoides* R. Br.

CINNAMON BELLS; POTATO ORCHID

Slender to moderately robust herb with thick fleshy scaly tuberous rhizomes; stems dark brown, normally 10–40 cm tall. Racemes erect, rarely drooping, 2.5–10(–25) cm long, pedicels including ovary 5–10 mm long, subtending bracts 3–6 mm long; flowers few-many, fragrant, white and brown outside; perianth 1.3–2 cm long, lobes obtuse, 3–5 mm long, margin crisped; labellum mobile on a broad claw adnate to basal projection of lateral sepals, 0.7–1.2 cm long, \pm oblong with blunt point, obscurely lobed at $ca \frac{1}{3}$ – $\frac{1}{2}$ its length, lateral lobes small, margin upturned, undulate or lacerate, disc with 2 raised yellow to orange calli commencing above basal auricles, becoming confluent just above lateral lobes and continuing to just below apex; column curved, ca 8–10 mm long; anther 1.5–2 mm long. Capsules obovoid-turbinate, verrucose. **Fig. 55D.**

Usually in cool moist shady areas, favouring well drained organically rich areas in the southern parts of the region, e.g. Mt Tamborine, Lamington Plateau, rarely in swampy situations among sedges. Flowers mainly spring.

7. DIPODIUM R. Br.

Terrestrial herbs, either \pm erect or climbers with closely distichous and sheathing leaves, or leafless saprophytes with imbricate sheathing bracts; roots very thick, and brittle in saprophytes. Inflorescences \pm erect terminal racemes; flowers often numerous and showy; labellum sessile on base of column, distinctly 3-lobed, close to and parallel to column with lateral lobes slender and \pm column-embracing to form tube, midlobe much larger than laterals, \pm narrowly ovate, convex, pubescent in part; column erect, moderately stout and \pm dilated towards apex, lateral wings \pm vestigial or absent, $ca \frac{1}{2}$ length of labellum; anther versatile, rostrate, pollinia 2, bony, cleft, each attached by a separate rather long stipe to viscidium; stigma relatively small, sunken, very high on column.

About 22 species, Malaysia, Australia, Palau Is, Solomon Is, Vanuatu, New Caledonia; 8 species Australia; 3 species south-eastern Queensland.

- | | |
|--|----------------------------|
| 1. Flowers yellow to greenish, spotted and streaked with red or mauve | 1. <i>D. hamiltonianum</i> |
| Flowers cream, mauve or pink, heavily blotched and spotted | 2 |
| 2. Perianth segments recurved; ovary gibbous, dark spots prominent on pedicels and ovaries | 2. <i>D. variegatum</i> |
| Perianth segments not recurved; ovary not gibbous, spots absent from pedicels and ovaries | 3. <i>D. pulchellum</i> |

1. *Dipodium hamiltonianum* F. M. Bailey

YELLOW HYACINTH ORCHID

Dipodium punctatum var. *hamiltonianum* (F. M. Bailey) F. M. Bailey; *D. punctatum* auct. non (Smith) R. Br., Fitzg.

Leafless saprophyte up to 80 cm tall. Floral stems greenish, spotted, basal bracts thick, imbricate, obtuse, pedicel including ovary ca 3 cm long; flowers bright yellow to dull yellowish green with red or purple spots or streaks, segments widely spreading but not reflexed or recurved; sepals narrowly oblong-obovate, 1.6–2.2 cm \times 0.4–0.5 cm; petals narrowly oblong-obovate, 1.5–2 cm \times 0.3–0.4 cm; labellum 1.2–1.8 cm long, lateral lobes \pm oblong, 3–5 mm long, hairy on inside of base, midlobe oblong-elliptic, 1–1.2 cm long, disc with 2 short hairy deltoid ridges near base, divergent, lamina with central band of mauve hairs ca 1 mm long in apical half, shortly pubescent between these hairs and the callus; column ca 10 mm long, wings fairly prominent, apical margin not very irregular. **Fig. 55E.**

Coastal wallum and inland parts, often on sandy or gravelly soils, e.g. Coolumb, Noosa, Amiens, Gurulmundi areas. Flowers spring–early summer.

Dipodium punctatum (Smith) R. Br. has long been recorded from Queensland but recent studies have shown it is confined to southern Australia. A white flowered form referred to as *D. punctatum* var. *album* by F. M. Bailey in Syn. Queensland Fl. Suppl. 3:73 (1890) is probably a form of *D. variegatum*.

2. *Dipodium variegatum* M. Clements & D. Jones

Leafless saprophyte up to 60 cm tall but often less than 25 cm tall. Floral stems greenish to purplish red, basal bracts narrowly ovate, imbricate, keeled, acute, pedicels and gibbous ovary with conspicuous maroon spots, *ca* 2 cm long; flowers cream or light pink with heavy maroon blotching, segments widely spreading, reflexed near tips; sepals linear-ovate, 1.2–1.8 cm \times 0.3–0.5 cm; petals narrowly ovate, slightly falcate, 1.2–1.7 cm \times 0.3–0.4 cm; labellum mauve or maroon, 1.2–1.5 cm long, lateral lobes linear-spathulate, 4–5 mm \times *ca* 1 mm, midlobe narrowly ovate, 0.8–1.2 cm \times 0.35–0.5 cm, disc with linear pubescent divergent keels near base, lamina with a central band of mauve hairs *ca* 1 mm long, extending from callus to apex where becoming broad and densely tangled; column *ca* 8 mm long.

Widespread in Moreton, Darling Downs and Wide Bay districts, growing in open forest, woodland and heathland; often locally common. In favourable seasons a number of inflorescences can be produced in succession from a single plant. Flowers summer.

A dark-flowered variant from the Moreton district is under study.

3. *Dipodium pulchellum* D. Jones & M. Clements

Leafless saprophyte up to 90 cm tall. Floral stems green to reddish, basal bracts thick, imbricate, obtuse, pedicel including ovary 2–2.5 cm long; flowers deep rosy pink, heavily suffused with darker spots and blotches, segments widely spreading but not reflexed or recurved; sepals ovate to narrowly ovate, 1.3–1.5 cm \times 0.4–0.5 cm; petals narrowly ovate, slightly falcate, 1.2–1.4 cm \times 0.4–0.45 cm; labellum dark reddish pink, 1.2–1.4 cm long, lateral lobes linear-spathulate, 4–5 mm \times *ca* 1 mm, midlobe broadly elliptic, 9–10 mm \times 5–6 mm, disc with 2 linear-clavate pubescent divergent keels near base, lamina with a narrow central band of mauve hairs *ca* 0.3 mm long extending from callus to apex; column *ca* 10 mm long.

Recorded from Moreton district, usually on soils of basalt origin, in open forest and rainforest margins, e.g. Tallebudgera, Tamborine Mtn, Mt Superbus, Cunningham's Gap. Flowers summer.

8. ARTHROCHILUS F. Muell.

Terrestrial glabrous herbs with small obovoid tuberosids. Leaves appearing as a rosette which is unattached on sterile plants or developed as a lateral growth on flowering plants, persisting long after flowering season has ended, or absent in a saprophytic species. Inflorescences of terminal racemes; sepals and petals \pm similar, \pm linear, dorsal sepal erect, lateral sepals and petals either spreading or deflexed; labellum above column, articulate by a long slender moveable claw on column foot, disc slender, peltate, either hammer-shaped or insect-like, partly or wholly covered with tubercles or hair-like processes, upper part emarginate or separated into 2 long divergent filiform tails; column long, slender, incurved or reflexed towards ovary, wings 2- or 3-lobed, foot various; anther erect, obtuse, 2-locular; rostellum almost obsolete; stigma peltate.

6 species endemic in Australia; 1 species south-eastern Queensland.

1. *Arthrochilus irritabilis* F. Muell.

LEAFY ELBOW ORCHID

Drakaea irritabilis (F. Muell.) H. G. Reichb.; *Spiculaea irritabilis* (F. Muell.) Schlechter

Slender herb with flowering stem 5–37 cm tall. Leaves 2–6; petioles sheathing, 4–7 mm long; blades ovate-oblong to elliptic or narrowly so, apex acute, base tapered, 2–6 cm \times 0.6–1.5 cm, glabrous, appearing as rosette which is unattached on sterile plants or developing as lateral growth on flowering plants, persistent after flowering season. Flowers 2–30, pedicel including ovary 0.5–1.2 cm long, subtended by ovate bract 2–5 mm long; dorsal sepal underneath column, narrowly oblong-obovate, obtuse, 0.8–1.4 cm long,

lateral sepals and petals linear, $\frac{1}{2}$ – $\frac{3}{4}$ length of dorsal, sharply deflexed; labellum slender, 5–7 mm long, decurved, apex tapered, \pm hanging by short claw from apex of column foot, furnished with large insect-like callus, “head” glandular and very broadly emarginate, “body” covered with gland-tipped cilia; column 7–9 mm long, retracted at right angles to axis of ovary, incurved with a pair of acute column wing lobes or wing-like appendages a little above middle and another pair close to summit. Capsules narrowly obovoid, 8–9 mm long. **Fig. 55F.**

Coastal districts, in swampy or sandy wallum areas or on sandy soils in eucalypt forest. Flowers summer–autumn.

9. CALEANA R. Br.

Terrestrial glabrous slender herbs, tuberoids oblong. Leaf solitary, radical. Inflorescences racemes of 1–4 flowers usually with rudimentary bud at apex; flowers reversed, lateral sepals and labellum inserted at base of column; labellum articulate on a prominent moveable claw with column foot, peltate with smooth convex upper surface; column long, appressed to ovary, margin broadly winged; anther 2-locular, 2 pollinia per loculus, pollen granular, caudicles absent.

1 species endemic in Australia, occurring in south-eastern Queensland.

1. *Caleana major* R. Br.

DUCK ORCHID; BEE ORCHID

Caleya major (R. Br.) R. Br.

Slender herb 15–50 cm tall. Leaf reddish green, linear to narrowly ovate, acute, 5–15 cm long. Peduncle wiry, usually with narrow sheathing acute bract 0.7–1.5 cm long towards base, pedicels 0.8–1.7 cm long, subtended by acute bract 5–7 mm long; dorsal sepal channelled, narrowly obovate or spatulate, mucronate, curving closely behind column, 1–1.4 cm long, lateral sepals reflexed, channelled for basal half, abruptly contracted and tubular or filiform for upper half, 1.2–1.5 cm long; petals linear, acute, 1–1.2 cm long; labellum claw strap-shaped, 5–7 mm long, labellum ovate, peltate, centre inflated and hollow, cavity open below, 7–9 mm \times 7–8 mm, produced on column side into beak, at opposite end into flat oblong obtuse appendage 2.5–3.5 mm long; column incurved, elongate, 1–1.2 cm long, wings *ca* 5 mm broad, forming receptacle, closed by labellum when claw is irritated. **Fig. 55G.**

Sandy heaths near the coast, and eucalypt open forests on near-coastal slopes of the coastal districts, also recorded from Girraween National Park near Stanthorpe. Flowers spring–summer.

10. PARACALEANA D. Blaxell

Terrestrial glabrous extremely slender herbs, tuberoids oblong. Leaf solitary, radical. Inflorescences racemes of 1–4 flowers usually with a rudimentary apical bud; flowers reversed; dorsal sepal and petals attached at base of column, lateral sepals and labellum articulate on a prominent moveable claw; labellum peltate, upper surface convex, \pm tuberculate; column long, held at right angles to ovary, broadly winged, wings decurrent on column foot as well as column; anther 2-locular, 2 pollinia per loculus, pollen granular, caudicles absent.

4 species endemic in Australia; 1 species south-eastern Queensland.

1. *Paracaleana minor* (R. Br.) D. Blaxell

SMALL DUCK ORCHID

Caleana minor R. Br.; *Caleya minor* (R. Br.) Sweet; *Caleya sullivanii* F. Muell.; *Caleana sullivanii* (F. Muell.) E. E. Pescott; *Caleana nublingii* Nicholls; *Paracaleana sullivanii* (F. Muell.) D. Blaxell

Herb 6–17 cm tall. Leaf linear, acute, 4–12 cm long. Peduncle without sheathing bract, pedicels 0.7–1.5 cm long, subtended by acute bract 2–4 mm long; dorsal sepal narrowly obovate-spatulate, 6–8 mm long, lateral sepals slightly channelled, narrowly oblong, *ca* 6–7 mm long; petals filiform, obtuse, *ca* 6 mm long; labellum claw strap-shaped, 3–4 mm long, labellum ovate, 3–4 mm \times 2.5–3 mm, peltate on claw, produced on column side

into bifid gland-tipped appendage *ca* 1.5 mm long, at opposite end into obtuse process 0.5 mm long, with a spur on each side, centre inflated, hollow, upper surface and margin tuberculate except at base; column foot 3–4 mm long, column 4.5–6 mm long, wings decurrent on column foot, 2.5–4 mm \times 2–3 mm.

Recorded from Moreton and Wide Bay districts in habitats similar to *Caleana major*, also recorded from Girraween National Park near Stanthorpe. Flowers spring–summer.

11. CHEIROSTYLIS Blume

Plants with supraterranean rhizome considerably thicker than short stem; roots absent. Flowers few; sepals fused for *ca* $\frac{1}{2}$ their length to form basally swollen tube; labellum joined to base of column, shortly shallowly saccate at base with a few papillae or calli inside, expanded and deeply bilobed towards apex, apical margin of lobes \pm dentate; column short with 2 \pm forward projecting apical arms considerably longer than column; anther attached to back of column, pollinia granular, rather small, deeply grooved so as to appear 4, attached to long viscidium; rostellum between anther and stigma deeply cleft, long and forward projecting; stigmatic lobes 2, 1 on either side of column arms.

22 species, tropical Africa, Asia, Pacific region; 1 species Australia, occurring in south-eastern Queensland.

1. *Cheirostylis ovata* (F. M. Bailey) Schlechter

Gastrodia ovata F. M. Bailey; *Cheirostylis grandiflora* Maiden; *Zeuxine attenuata* R. Rogers & C. T. White

Slender lithophytic or terrestrial herb 10–25 cm tall in flower; rhizome *ca* 1 cm diameter, constricted about nodes, internodes with discs which provide attachment to rocks, roots absent but underside of rhizome with minute root hairs; stem short, 1–2 mm diameter. Leaves 2–7, often dead at flowering time, a few arising from stem, rest in terminal rosette; petioles with sheathing bases, 3–9 mm long; blades ovate, apex acute to acuminate, base cuneate, 1–4 cm \times 1–1.5 cm. Flowers 1–6, white, peduncle with 3 or 4 acuminate, sheathing bracts *ca* 0.8–1.5 cm long, pedicels 2–4 mm long, subtended by long acuminate bracts 5–7 mm long, ovary swollen, *ca* 4–5 mm long; dorsal sepal ovate, joined for *ca* $\frac{1}{2}$ its length to lateral sepals forming a hood, lateral sepals narrowly ovate, joined for almost entire length, all 0.5–1.2 cm long; petals narrowly oblong, *ca* 0.6–1.1 cm long; labellum with small shallow basal sac with 2 small calli, 1 on either side, 3-horned, disc twice as long as sac, narrowly oblong, 2 short parallel swellings at its apical end, apical lobes of labellum usually oblong, apical margin dentate, *ca* 3–4 mm \times 2–3 mm; column very short. **Fig. 55H.**

Recorded from McPherson Ra. in rainforest. Flowers late winter–spring.

12. ZEUXINE Lindl.

Plants with rhizome and stem almost same thickness; roots present. Leaves present. Inflorescences with few–many flowers; dorsal sepal and petals galeate, lateral sepals spreading, concave, enclosing base of labellum; labellum with saccate basal part which has single gland on either side near base, and tapered to neck, then transversely widened, either \pm bilobed with lobes outstretched or smaller and spreading with sides \pm erect, appearing saccate; column very short; rostellum long, deeply cleft; pollinia 2, caudicles and viscidium present; stigma 2-partite at base of rostellum.

76 species, tropical and subtropical Africa, India, Malaysia, Indonesia, New Guinea, Australia, western Pacific; 1 species Australia, occurring in south-eastern Queensland.

1. *Zeuxine oblonga* R. Rogers & C. T. White

Terrestrial or occasionally lithophytic herb 10–45 cm tall when flowering; rhizome and stem 2–4 mm diameter, brittle, stem 5–15 cm long with few–several leaves scattered along it and often rosette of leaves terminating it. Leaves 3–7, often dead at flowering time; petioles dilated into sheath, 0.2–1.2 cm long; blades ovate, apex acute, mucronate,



Fig. 55 ORCHIDACEAE — A₁-A₂ *Rhizanthella slateri*, A₁ habit x 1, A₂ side view of flower x 1½; B *Erythrorchis cassythoides*, habit x 1; C *Epipogium roseum*, part of inflorescence x 1½; D *Gastrodia sesamoides*, part of inflorescence x 1; E *Dipodium hamiltonianum*, flower x 1½; F *Arthrochilus irritabilis*, part of inflorescence x 1; G *Caleana major*, flower x 1; H *Cheirostylis ovata*, habit x 1.

base cuneate, margin undulate, 2–8 cm \times 1–3 cm. Inflorescences up to 30 cm tall, puberulent to villous, with 2 or 3 bracts up to 2 cm long, flowers 2–30, pedicel and ovary 0.6–1.3 cm long, subtended by long acuminate bracts 4–10 mm long; sepals dull green, puberulent, dorsal ovate, deeply concave at base, 3–6 mm long, laterals ovate, *ca* 3–4 mm long; petals translucent-white, \pm oblong, 4–5 mm long; labellum white, *ca* 5–6 mm long, base deeply saccate, *ca* 2 mm long, narrow for *ca* 1 mm, expanded apex divided into 2 divaricate equal parts *ca* 2 mm long, squarish or oblong, apical margin sometimes irregular; column stout, 1 mm long. Capsules ellipsoid, 1–1.2 cm long, puberulent with multicelled hairs.

Recorded from Wide Bay and Moreton districts in near-coastal rainforest, e.g. Cooloola, Noosa area, Currumbin. Flowers spring.

13. PHAIUS Lour.

Usually large terrestrial herbs; stems clumped together with a number of internodes, either pseudobulbous or elongated and rather thin. Leaves large, membranous, plicate. Inflorescences 1 or more radical racemes, tall, erect, with a few sheathing bracts; flowers usually large; sepals and petals free, widely spreading; labellum sessile on base of column, often joined to it for a short distance, free part usually embracing or encompassing column, base either spurred or \pm saccate, disc keeled on upper surface, 3-lobed or entire; column elongate, inclined forward; anther terminal, operculate, pollinia 8 in 2 groups of 4, attached to the branches of a dichotomous caudicle; stigma recessed into anterior apex of column.

50 species, tropical Africa, Mascarenes, tropical Asia, Australia, Polynesia; 4 species Australia; 3 species south-eastern Queensland.

- | | | |
|---|----------------------------|---|
| 1. Flowers yellow inside | 1. <i>P. bernaysii</i> | |
| Flowers red-brown to brown inside | | 2 |
| 2. Labellum formed into a tube and encompassing column | 2. <i>P. tancarvilleae</i> | |
| Labellum not formed into a tube, lateral lobes of labellum \pm erect and incurved | 3. <i>P. australis</i> | |

1. *Phaius bernaysii* Rowland ex H. G. Reichb.

Phaius australis F. Muell. var. *bernaysii* (Rowland ex H. G. Reichb.) Nicholls; *P. blumei* Lindl. var. *bernaysii* (Rowland ex H. G. Reichb.) H. G. Reichb. ex J. D. Hook.; *P. grandifolius* Lour. var. *bernaysii* (Rowland ex H. G. Reichb.) F. M. Bailey; *P. grandifolius* var. *bernaysii* forma *idae* F. M. Bailey; *P. bernaysii* forma *idae* (F. M. Bailey) Hunt

Large herb up to 2.1 m tall in flower but usually much shorter; pseudobulbs \pm ovoid, 3–7 cm diameter. Leaves 4–7, very narrowly elliptic or very narrowly ovate, apex acute, tapering into sheathing petiole, 0.3–1.2 cm long, plicate. Scape up to 2 m tall, 1.5 cm diameter with sheathing bracts 5–6.5 cm long, pedicels including ovary 2.5–4 cm long, subtended by ovate acuminate bract 4–5 cm long; flowers white outside, sulphur-yellow inside, sometimes not opening and cleistogamous; sepals oblong-ovate, acute, 4–6 cm long; petals \pm elliptic, acute, slightly smaller; labellum 3.5–5.5 cm \times 2.5–4.5 cm when flattened, spurred, lateral lobes yellow inside, semicircular, margin often undulate, erect and incurved but not forming a tight tube, midlobe yellow, \pm ovate, margin undulate to crisped, disc cream, pubescent; column up to 2 cm long, erect, dilated near apex, column wings pointed.

Recorded from islands in Moreton Bay and southern Wide Bay district, in swamps. Flowers spring–early summer. Rare and endangered due to activities of sand mining and collectors.

2. *Phaius tancarvilleae* (Banks ex L'Hérit.) Blume

SWAMP ORCHID

Limodorum tancarvilleae Banks ex L'Hérit.; *L. incarvillei* Pers.; *Bletia tankervilleae* (Banks) R. Br.; *Pachygone spectabilis* Salisb.; *Phaius grandifolius* Lour.; *Phaius blumei* Lindl.; *Phaius grandifolius* var. *superbus* L. B. van Houtte; *Phaius carronii* F. Muell.; *Phaius leucophaeus* F. Muell.; *Phaius wallichii* J. D. Hook.; *Phaius incarvillei*

(Pers.) Kuntze; variously misspelt as *Phaius tankervillei*, *P. tankervilliae* or *P. tankervilleae*

Large herb similar to *P. bernaysii*. Flowers 3–14, white outside, cinnamon-brown to brown inside, sometimes not opening and cleistogamous; sepals spreading, oblong-ovate, acute, 4–6.5 cm long; petals \pm elliptic, acute, slightly smaller; labellum 3–5 cm \times 2–4.5 cm when flattened, adnate to base of column, 3-lobed, lateral lobes white suffused with yellow and blotched red, rounded, inrolled into a tight tube encompassing column, midlobe mauve or white suffused with mauve, \pm semicircular, apiculate, margin crisped, disc with oblong-ovate acuminate raised plate, pubescent towards apex; column *ca* 2 cm long, sparsely pubescent. Capsules *ca* 4 cm long. **Fig. 56A.**

Moreton and Wide Bay districts in swampy areas, becoming rare. Flowers spring–early summer.

3. *Phaius australis* F. Muell.

Phaius grandifolius auct. non Lour. nec Lindl., Benth.; *P. grandifolius* Lour. var. *bernaysii* (Rowland ex H. G. Reichb.) F. M. Bailey forma *soutteri* F. M. Bailey; *P. grandifolius* Lindl. var. *rowanae* F. M. Bailey; *P. bernaysii* Rowland ex H. G. Reichb. forma *soutteri* (F. M. Bailey) Hunt

Large herb similar to *P. bernaysii*. Flowers white outside, red-brown with yellow veins or greenish yellow inside, sometimes not opening and cleistogamous; sepals oblong-ovate, acute, 4–6 cm long; petals \pm elliptic, acute, slightly smaller; labellum 3.5–5.5 cm \times 2.5–4.5 cm when flattened, spurred, lateral lobes red-brown inside, crescent-shaped or almost semicircular, erect and incurved but not forming a tight tube, midlobe yellow, \pm broadly ovate, apiculate, margin undulate, disc yellow, pubescent near apex; column up to 2 cm long, sparsely hairy, dilated near apex with apical margin as high as or higher than apex of anther.

Recorded from islands in Moreton Bay in the Moreton district, in swamps. Flowers spring–early summer.

14. GEODORUM Jackson

Terrestrial herbs with fleshy rhizome and almost round pseudobulbs. Leaves several on short stalk, broad, plicate, uppermost largest. Inflorescences separate from leaf-bearing stalk, racemose; flowers crowded on short nodding rachis; perianth segments free, almost equal in length; labellum sessile on column foot, forming with it a saccate base, obscurely lobed, not spurred, lateral lobes erect, close to column; column erect, short; anther operculate, concave, pollinia 2, 2-lobed, waxy, caudicle short; rostellum small.

16 species, India to Polynesia, Australia; 1 species Australia, occurring in south-eastern Queensland.

1. *Geodorum neocaledonicum* Schlechter

PINK NODDING ORCHID

Geodorum densiflorum auct. non (Lam.) Schlechter; *G. pictum* auct. Qld non (R. Br.) Lindl.

Deciduous herb; leaf-bearing stem with leaves, inflorescence and new pseudobulb from which they arise all developing simultaneously. Leaf bearing stem 2–8 cm long with a few sheathing bracts, leaves 3–5, terminal on stem; petioles up to 15 cm long; blades ovate or narrowly ovate or elliptic, acute, base tapered into petiole, margin undulate, 10–35 cm \times 3–9 cm, with 3 ribs and 4 longitudinal veins. Raceme at first erect while developing, but gradually bending through 180° until mature flowers face ground, after fertilization peduncle again straightening, peduncle with usually 5 bracts, lowest sheathing, pedicel including ovary 5–10 mm long, subtending bracts narrowly triangular, apex attenuate, 0.5–1.5 cm long; flowers 8–20, crowded, usually pale pink to reddish, appearing tubular; sepals oblong-obovate, acute, 1–2 cm \times 0.25–0.5 cm; petals obovate, obtuse, 1–2 cm \times 0.25–0.4 cm; labellum pink with dark red or purple veins, saccate, 1–1.5 cm long, obscurely 3-lobed, lateral lobes very obtuse, broad, incurved, embracing column, midlobe broadly triangular, emarginate, margin often undulate, disc with 2 double raised lines or

plates gradually merging into one or fading out halfway to apex; column 4–6 mm long, wings rudimentary. Capsules obovoid to obloid-ellipsoid, 2–5 cm long, strongly ribbed. **Fig. 56B.**

Moreton and Wide Bay districts, on sand or sandy soil in heath, open forest or light rainforest. Flowers summer.

15. MALAXIS Solander ex D. Swartz

Terrestrial, lithophytic or rarely epiphytic plants; stems usually elongated, in Australian species with limited apical growth, new branches of sympodium commencing from almost any node except those at or near apex. Leaves few or many scattered along stem, usually shortly petiolate, usually ± plicate, often asymmetrical. Inflorescences apical, usually many-flowered; flowers small, reversed; sepals and petals free, spreading or recurved; labellum saccate, sometimes basally lobed, usually broad; column short, with short broad wings near apex; rostellum very small, anther subterminal, pollinia 4; stigma in between wings of column.

About 300 species, throughout warmer regions and into northern temperate regions; 5 species Australia; 1 species south-eastern Queensland.

1. *Malaxis latifolia* Smith

Gastroglottis montana Blume; *Dienia congesta* Lindl.; *Malaxis plicata* Roxb.; *Microstylis congesta* (Lindl.) H. G. Reichb.; *Microstylis bernaysii* F. Muell.; *Liparis bernaysii* (F. Muell.) F. M. Bailey; *Microstylis latifolia* (Smith) J. J. Smith

Stems stout, 7–20 cm tall, new shoots usually commencing from basal internode of previous stem. Leaves 3–6; petioles 0–7 cm long; blades ovate or narrowly ovate, apex acute, base cuneate, plicate, margin undulate, 7–30 cm × 4–9 cm. Inflorescences 5–30 cm long, peduncle ± as long as rachis, pedicels including ovary 2–3 mm long, subtending bracts 3–6, not sheathing, filiform, 4–7 mm long; flowers numerous, yellowish green, brown, reddish or purple; dorsal sepal linear, concave, acute or blunt, *ca* 3 mm × 0.75–1 mm, somewhat incurved, lateral sepals oblong to ovate, obtuse, *ca* 3 mm × 1.5 mm, recurved over labellum so that apices often almost touch apex of dorsal sepal; petals linear, incurved, obtuse, *ca* 3 mm × *ca* 0.5 mm; labellum *ca* 2.5 mm long, saccate and almost encompassing column, 3-toothed apically, teeth blunt, central one longer than other 2 and decurved, auricles short, blunt; column *ca* 1.7 mm long, slightly dilated at base, wings oblong, directed slightly upwards. Capsules obovoid to obloid, 6–9 mm long.

Reported to occur in south-eastern Queensland but specimens lacking, its preferred habitat being in the understorey of or close to rainforest, occasionally on rocks. Flowers summer–autumn.

16. LIPARIS Rich.

Epiphytic, lithophytic or terrestrial herbs; stems usually clustered, usually pseudobulbous. Leaves ± radical, usually long. Inflorescences terminal on developing branch of sympodium, usually racemose; flowers usually small; perianth segments usually free, spreading or reflexed; labellum sessile at foot of column, often sharply reflexed about middle; column usually elongated and curved, usually slightly winged; anther operculate, pollinia 4 in 2 pairs, waxy, without caudicles.

250 species, tropical and temperate except New Zealand; 10 species Australia; 4 species south-eastern Queensland.

- | | |
|---|----------------------------|
| 1. Terrestrial herbs; leaves not jointed at base | 2 |
| Epiphytic or lithophytic herbs; leaves jointed at base | 3 |
| 2. Leaf blades ovate to broadly ovate; flowers deep reddish purple | 1. <i>L. simmondsii</i> |
| Leaf blades very narrowly ovate to very narrowly elliptic; flowers greenish to yellowish green | 2. <i>L. habenarina</i> |
| 3. Labellum oblong, bent through more than 90°, usually <i>ca</i> 180°; lithophytes generally growing into extensive dense masses | 3. <i>L. swenssonii</i> |
| Labellum cuneate, bent through less than 90°; small epiphytes usually on trees | 4. <i>L. coelogonoides</i> |

1. *Liparis simmondsii* F. M. Bailey

Erect terrestrial herb up to *ca* 20 cm tall; basal part of short stem covered with striate sheathing acuminate bracts up to 4.5 cm long. Leaves with petioles dilated into sheathing bases, 2–3 cm long; blades ovate to broadly ovate, apex acuminate, base cuneate to rounded, margin undulate, 5–12 cm \times 2.5–6 cm, 5-ribbed, somewhat plicate, shiny. Inflorescences erect, 15–25 cm tall, peduncle 4-angled, pedicels including ovary up to *ca* 2 cm long, subtending bracts minute; flowers 3–15, erect on ovary, deep reddish purple with green column, perianth segments spreading but irregularly curved and twisted; dorsal sepal linear-oblong, apex decurved, *ca* 1.1 cm \times 0.05–0.1 cm, lateral sepals oblong, *ca* 8 mm \times *ca* 2 mm; petals linear, *ca* 10 mm long; labellum *ca* 10 mm long when flattened, basal part semi-erect, channelled, then decurved through *ca* 90°, channel extending *ca* $\frac{2}{3}$ length of labellum, apex obtuse, rounded, apical margin shallowly crenate or serrate, 2 calli *ca* 0.5 mm long near base; column *ca* 5 mm long. Capsules obovoid, 2–2.5 cm long, ribbed.

Recorded from Eudlo and Buderim areas at the turn of the century, common at Cooloola National Park in littoral rainforest. Flowers summer.

2. *Liparis habenarina* (F. Muell.) Benth.

Sturmia habenarina F. Muell.; *Leptorchis habenarina* (F. Muell.) Kuntze

Erect terrestrial herb 15–60 cm tall. Leaves usually 2 or 3, dull green or yellowish, narrowly oblong or narrowly elliptic, apex acute or blunt, base sheathing, 10–25 cm \times 1–4 cm, often plicate. Inflorescences erect, 15–60 cm long, peduncle distinctly angular, sometimes very ribbed, usually with 1 very narrow bract near base, pedicels including ovary 5–10 mm long, subtended by acuminate bract 3–10 mm long; flowers 8–22, greenish yellow sometimes with reddish tinges; dorsal sepal narrowly oblong, reflexed, 5–8 mm \times *ca* 1 mm, lateral sepals elliptic, united for *ca* $\frac{1}{4}$ – $\frac{1}{3}$ their length, \pm acute, decurved, *ca* 3–4 mm \times 2.5–3 mm; petals linear, reflexed, 5–7 mm \times *ca* 0.5 mm; labellum *ca* 4–6 mm \times 2.5–4 mm when flattened, basal half semi-erect, channelled, then decurved through *ca* 90°, upper half somewhat channelled, apex emarginate but middle channelled section mucronate, calli 2; column 4–5 mm long, stout, incurved, wings *ca* 0.5 mm wide. Capsules narrowly obovoid, *ca* 1.5–2 cm long, ribbed.

Throughout the region, on sandy or swampy soils in open forests. Flowers summer–autumn.

3. *Liparis swenssonii* F. M. Bailey

Liparis reflexa (R. Br.) Lindl. var. *parviflora* Nicholls

Usually lithophytic, rarely epiphytic herb, growing into extensive dense masses, pseudobulbous. Leaves 1–3, lowest reduced to sheathing scales, linear-elliptic or linear-oblong, acute, base sheathing, 7–30 cm \times 0.8–3.5 cm, usually channelled and rather thick. Inflorescences up to 20 cm long, scape somewhat angular, 1 or 2 narrow bracts up to 2.5 cm long, pedicels including ovary 0.6–1.3 cm long, subtending bracts acuminate, 5–10 mm long; flowers 6–30, yellowish green, with very unpleasant odour; dorsal sepal linear, acute, recurved at right angles to column, 8–9 mm long, lateral sepals linear-elliptic, acute, spreading or deflexed, 7–8 mm \times 1.5–2 mm; petals linear, acute, spreading or deflexed, 6–8 mm long; labellum oblong, 5–7 mm long, basal half suberect and channelled, then very sharply deflexed through *ca* 180°, with 2 small orange ridges extending to bend, apex broad, obtuse, shortly apiculate, margin sometimes irregular; column slender, incurved, 4–6 mm long, with 2 membranous wings *ca* 0.5 mm wide at apex. Capsules obloid-ellipsoid to obovoid, 0.7–1.3 cm long.

Mainly coastal districts in rocky areas, e.g. Mt Cooroy, Mt Greville, Mt Tamborine, Bunya Mts. Flowers autumn–winter.

L. reflexa (R. Br.) Lindl. (*Cymbidium reflexum* R. Br.) has been erroneously recorded from south-eastern Queensland. All records of this species are referable to ***L. swenssonii***.

4. *Liparis coelogynoides* (F. Muell.) Benth.

Sturmia coelogynoides F. Muell.; *Leptorchis coelogynoides* (F. Muell.) Kuntze; *Liparis mowbulana* F. M. Bailey

Small epiphyte on trees, rarely lithophytic, pseudobulbous. Leaves usually 2 or few,

lowest reduced to sheathing scales or bracts, upper linear-elliptic, acuminate, 5–15 cm \times 0.2–1.5 cm. Scapes very slender, 10–28 cm long, with 1 or 2 subulate bracts 3–10 mm long below inflorescence, pedicels including ovary 4–10 mm long, subtending bracts subulate, 2–6 mm long; flowers 5–20, pale green or yellowish; sepals all decurved or widely spreading, linear-triangular, acuminate, 0.6–1.3 cm \times 0.1–0.2 cm; petals linear, 0.5–1.2 cm \times ca 0.1 cm; labellum \pm obovate or cuneate when flattened, 0.7–1.3 cm long, basal part suberect, slightly channelled, then slightly decurved, apex \pm truncate, apical margin sinuate or irregular but apiculate, disc usually with slightly raised callus; column very slender, ca 3–4 mm long, slightly incurved near apex, wings small. Capsules narrowly obovoid, ca 7–9 mm long. **Fig. 56D.**

Rainforest at high altitudes, e.g. Bunya Mts, McPherson Ra. Flowers mainly summer.

17. CALANTHE R. Br.

Usually tall terrestrial herbs with fleshy rhizomes; stems either elongate and slender, or pseudobulbous. Leaves usually large, plicate. Scapes radical with sheathing bracts; flowers in terminal racemes; perianth segments nearly equal, free, spreading; labellum usually spurred, connate at base with column to form tube, disc usually with calli; pollinia 8 in 2 groups of 4; stigma sometimes divided into 2 parts.

120 species, South Africa, Madagascar, tropical Asia to Japan, Indonesia, New Guinea, Australia, Tahiti, tropical America; 1 species Australia, occurring in south-eastern Queensland.

1. *Calanthe triplicata* (Willemet) Ames

CHRISTMAS ORCHID

Orchis triplicata Willemet; *Limodorum veratrifolium* Willd.; *Calanthe veratrifolia* (Willd.) R. Br.; *Alismorchis veratrifolia* (Willd.) Kuntze; *C. veratrifolia* var. *kennyi* F. M. Bailey

Herb up to 1.5 m tall when flowering, with pseudobulbs. Leaves 4–10; petioles 10–30 cm long; blades dark green, elliptic or narrowly elliptic, apex acuminate, base tapered, 25–45(–90) cm \times 6–12(–18) cm, plicate. Inflorescences 1 or 2 from axils of lower leaves, 0.3–1.5 m tall, sheathing bracts few, up to ca 4 cm long, pedicels including ovary 2–4.5 cm long, pubescent, subtended by narrowly ovate acuminate bracts up to 3.5 cm long; flowers numerous, white, crowded at apex of pubescent scape; dorsal sepal elliptic, acute to acuminate, 1–1.5 cm \times 0.7–0.9 cm, lateral ones obovate, acuminate, 1.2–1.6 cm \times 0.8–0.9 cm; petals obovate, acuminate, 1.1–1.3 cm \times 0.6–0.8 cm; labellum with filiform basal spur 1.2–2 cm long, 3-lobed, lateral lobes widely spreading, oblong, obtuse, ca 8–10 mm long, midlobe 1–1.2 cm long, deeply bifid with minute deflexed tooth at junction of lobes, each lobe 7–9 mm long, obtuse, disc with 6 yellow, variously lobed and united calli; column 6–8 mm long, wings adnate to disc of labellum to form tube leading to orifice of spur. Capsules obovoid to cylindrical, 2.5–4 cm long, ribbed. **Fig. 56C.**

Moreton and Wide Bay districts, in cool moist shady areas, or in rainforest. Flowers spring–summer.

18. CALADENIA R. Br.

Terrestrial herbs, usually \pm hairy on stem, ovary and leaf, with small tuberosids. Leaf solitary, linear to ovate. Flowers 1–few; dorsal sepal \pm erect or slightly incurved behind column, lateral sepals \pm similar, spreading or reflexed; petals often shorter, spreading or reflexed; labellum usually on a moveable claw, usually 3-lobed, base \pm erect, anterior part recurved, margin often fringed or variously toothed, disc and sometimes midlobe with calli, variously arranged; column \pm incurved, winged; anther 2-locular, valvate, pollinia 4 in 2 pairs, clavate caudicle absent; stigma discoid.

80 species, Malaysia, Australia, New Caledonia, New Zealand; 69 species Australia; 9 species south-eastern Queensland.

1. Sepal tips obtuse, acute or acuminate, never filamentous nor with club-like osmophores 2

- Sepal tips narrowed and filamentous or with club-like glandular osmophores 7

- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|--------------------------|---|
| 2. Margin of labellum midlobe entire | . | . | . | . | . | . | . | . | 3 |
| Margin of labellum midlobe dentate or with fringing calli | . | . | . | . | . | . | . | . | 4 |
| 3. Perianth segments <i>ca</i> 0.6 cm long, white | . | . | . | . | . | . | . | 1. <i>C. alata</i> | |
| Perianth segments <i>ca</i> 0.9–2 cm long, blue, rarely white | . | . | . | . | . | . | . | 2. <i>C. caerulea</i> | |
| 4. Labellum barred with red | . | . | . | . | . | . | . | . | 5 |
| Labellum and column not barred with red but rarely with irregular streaks or spots | . | . | . | . | . | . | . | . | 6 |
| 5. Flowers pink or white; lamina calli yellow, not crowded | . | . | . | . | . | . | . | 3. <i>C. carnea</i> | |
| Flowers greenish yellow; lamina calli dark purple, crowded | . | . | . | . | . | . | . | 4. <i>C. iridescens</i> | |
| 6. Calli on labellum long, in 2 rows | . | . | . | . | . | . | . | 5. <i>C. catenata</i> | |
| Calli on labellum short, in 4 rows | . | . | . | . | . | . | . | 6. <i>C. gracilis</i> | |
| 7. Sepal tips filamentous, lacking apical osmophores | . | . | . | . | . | . | . | 7. <i>C. filamentosa</i> | |
| Sepal tips narrowed but not filamentous, with prominent club-like apical osmophores | . | . | . | . | . | . | . | . | 8 |
| 8. Osmophores blackish; marginal teeth on labellum <i>ca</i> 1 mm long | . | . | . | . | . | . | . | 8. <i>C. atroclavia</i> | |
| Osmophores yellowish; marginal teeth on labellum 4–5 mm long | . | . | . | . | . | . | . | 9. <i>C. dilatata</i> | |

1. *Caladenia alata* R. Br.

Slender herb usually up to 12 cm tall. Leaf linear, 6–8 cm × *ca* 0.05 cm, glandular puberulent. Flowers solitary, whitish with mauve dots, on pedicels including ovary 0.8–1.2 cm long, bract on scape and bract subtending pedicel both *ca* 5 mm long; dorsal sepal narrowly elliptic, acute, 6–7 mm × 1–1.5 mm, lateral sepals narrowly elliptic, acute, *ca* 6 mm × 1–1.5 mm; petals narrowly elliptic, acute, 6–7 mm × *ca* 1 mm; labellum on claw *ca* 0.5 mm long, barred with purple, 4–5 mm long, 3-lobed, lateral lobes rounded, margin entire, midlobe yellowish, very recurved, margin ± entire, two prominent yellow marginal calli at base, calli of labellum yellow, clavate, in 2 rows in apical end of lateral lobes; column barred with purple, *ca* 4–5 mm long, wings 1–2 mm long towards apex; ovary 4–5 mm long, glandular pubescent.

Brisbane Forest Park in open forest. Flowers winter and spring.

2. *Caladenia caerulea* R. Br.

BLUE CALADENIA

Slender herb usually up to 10 cm tall, occasionally more. Leaf linear to very narrowly ovate-oblong, apex acute, 2.5–7 cm × 0.1–0.4 cm, pubescent to ± villous puberulent. Flower generally solitary, ± sky-blue rarely white, on pedicels including ovary 0.6–1.5 cm long, bract on scape and bract subtending pedicel both 3–7 mm long; dorsal sepal very narrowly elliptic, blunt, 1–1.7 cm × 0.2–0.3 cm, lateral sepals elliptic to elliptic-obovate, blunt, 0.9–2 cm × 0.3–0.6 cm; petals ± narrowly elliptic, blunt, 0.9–2 cm × 0.3–0.5 cm; most of labellum with bright red transverse bars, labellum cuneate, *ca* 4–6 mm long, 3-lobed, margin entire but often undulate, lateral lobes erect, rounded apically, midlobe golden yellow, recurved, calli with dark stalks and golden yellow heads, in 2 rows extending to apex; column 6–10 mm long, but incurved, wings 1–2 mm wide towards apex; ovary 4–7 mm long, glandular puberulent to almost glabrous.

Scattered throughout the region on sand or sandy soils, in heath or open forest. Flowers winter–spring.

3. *Caladenia carnea* R. Br.

PINK FINGERS

Caladenia catenata auct. non (Smith) Druce

Slender or robust herb up to 25 cm, rarely 60 cm tall. Leaf linear to linear-oblong, 2–14(–28) cm × 0.1–0.3 cm, pubescent or ± glabrous. Scares generally villous in lower part, bract acuminate, 0.4–0.8(–1.2) cm long, pedicels including ovary 1–2.5 cm long, glandular puberulent, subtended by bract 4–9 mm long; flowers 1 or 2, rarely 4, pink or less commonly white, glandular hairy; dorsal sepal erect, elliptic or narrowly oblong-elliptic, acute, 0.7–1.8(–2.5) cm × 0.1–0.5 cm, lateral sepals elliptic to elliptic-obovate, acute, 0.9–2.2(–2.5) cm × 0.3–0.7 cm; petals elliptic to elliptic-oblong, acute, 0.8–1.9 cm × 0.2–0.5 cm; labellum ± sessile, barred with conspicuous transverse red lines, 4–9 mm long, 3-lobed, lateral lobes erect, apex rounded, margin entire, midlobe very recurved,

dentate or with fringing calli, calli of labellum yellow, white or red, clavate, in 2 or sometimes 4 or 6 rows as far as bend; column white, green or pink, barred with red, 0.5–1.1 cm long, slightly incurved, wings 1–2 mm wide; ovary 5–10 mm long, glandular puberulent. Capsules \pm cylindrical, *ca* 1.7 cm long. **Fig. 56E.**

Three varieties occur in the region:

- | | | |
|---|---|---|
| 1. Robust plant up to 60 cm tall; flowers large, bright rose pink; calli sometimes in 4 or 6 rows | <i>C. carnea</i> var. <i>gigantea</i> | 2 |
| Slender plant up to 25 cm tall; flowers usually pink; calli in 2 rows | | |
| 2. Labellum not deeply 3-lobed, lateral lobes broad, transverse bars present | <i>C. carnea</i> var. <i>carnea</i> | |
| Labellum deeply 3-lobed, lateral lobes narrow, transverse bars absent | <i>C. carnea</i> var. <i>gracillima</i> | |

C. carnea var. *carnea* occurs scattered throughout the region on sand or sandy soils, in heathland or as understorey in open forest. *C. carnea* var. *gigantea* R. Rogers has been recorded from central areas in similar habitats. *C. carnea* var. *gracillima* Rupp is known only from the Yandina area in the Moreton district. All flower winter–spring.

4. *Caladenia iridescens* R. Rogers

BRONZE CALADENIA

Very slender herb up to 20 cm tall. Leaf dull green, narrow-linear, 7–12 cm \times 0.3–0.4 cm, sparsely villous. Scape very wiry, sparsely villous, one sheathing bract up to 1.3 cm long near centre and another below ovary; flowers 1–4, greenish yellow with golden tints, all segments with dark glandular hairs, on pedicels including ovary 0.9–1.2 cm long; dorsal sepal very narrowly ovate or somewhat spatulate, cucullate, incurved, 1–1.3 cm \times 0.3–0.4 cm, lateral sepals very narrowly ovate, falcate, widely divergent, 1–1.3 cm \times 0.3–0.4 cm; petals very narrowly ovate, blunt, 0.9–1.2 cm \times 0.2–0.3 cm; labellum with bright red transverse bars, *ca* 4–6 mm long, 3-lobed, lateral lobes erect or incurved, entire, midlobe dark red, triangular, recurved, margin with dark purple glandular calli, calli globular, shortly stalked, crowded in 2–4 rows to apex.

Recorded from areas south of Stanthorpe in the Darling Downs district, on gravelly soils in eucalypt open forest, but status needs investigation. Flowers spring.

5. *Caladenia catenata* (Smith) Druce

WHITE CALADENIA

Arethusa catenata Smith; *Caladenia alba* R. Br.; *C. carnea* var. *alba* Benth; *C. alba* var. *picta* Nicholls

Slender herb up to 30 cm tall. Leaf linear to linear-elliptic or linear-oblong, acute, 3.5–21 cm \times 0.1–0.3 cm, puberulent to \pm glabrous. Scapes generally villous in lower part, bract long acuminate, 1–1.4 cm long, pedicels including ovary 1–2.5 cm long, subtended by acuminate bract 4–7 mm long; flowers 1 or 2, rarely 3, usually white except for yellow or orange tip to labellum and yellow headed calli but sometimes pink or mauve tinged; dorsal sepal erect, narrowly elliptic, acute, 1.2–2.2 cm \times 0.2–0.35 cm, lateral sepals elliptic, acute, 1.3–2.3 cm \times 0.3–0.6 cm; petals elliptic, acute, 1.2–2.2 cm \times 0.25–0.4 cm; labellum white, \pm sessile, 6–10 mm long, 3-lobed, lateral lobes erect, occasionally stained deep mauve or purple, apex rounded, margin entire, midlobe small, recurved, with fringing calli, labellum calli clavate, heads white or yellow, 1–2 mm long, in 2 rows; column green rarely with red bars, incurved, 0.7–1.2 cm long, wings *ca* 1–2.5 mm wide; ovary 6–10 mm long, glandular pubescent. Capsules ellipsoid, 1–1.3 cm long.

Coastal districts on sand or sandy soils, in heathland or in open forest, possibly other districts as well. Flowers late autumn to early spring.

6. *Caladenia gracilis* R. Br.

MUSKY CALADENIA

Caladenia angustata Lindl.; *C. testacea* R. Br. var. *angustata* (Lindl.) Ewart

Slender herb up to 40 cm tall. Leaf linear to linear-elliptic, acute, 8–20 cm \times 0.1–0.5 cm, puberulent to \pm glabrous. Scapes generally villous in lower part, bract acuminate, 0.5–2 cm long, pedicels including ovary 1–2 cm long, subtended by bract 0.4–1.1 cm long; flowers 1–3, rarely 4, white, pink or cream, glandular hairy outside; dorsal sepal cucullate, 1–1.2 cm \times *ca* 0.2 cm, lateral sepals narrowly elliptic to narrowly obovate, acute, 1.2–1.4 cm \times 0.25–0.4 cm; petals narrowly elliptic, acute, 1.1–1.3 cm \times 0.2–0.25 cm; labellum sometimes irregularly streaked or spotted with red or purple, 4–7 mm long,

3-lobed, lateral lobes occasionally obscure, margin entire or with calli in upper part, midlobe decurved, tip usually blotched, with marginal fringing calli, labellum calli short, clavate, heads yellow, white or red, in 4 rows; column slightly incurved, 5–8 mm long, wings *ca* 1 mm wide; ovary 5–8 mm long, glandular pubescent. Capsules ellipsoid, 1.1–1.3 cm long.

Possibly found in southern Darling Downs district, on sandy soils in open forest or heath. Flowers spring.

7. *Caladenia filamentosa* R. Br.

DADDY LONG LEGS

Slender herb 15–40 cm tall. Leaf dull green, linear, 7–15 cm \times 0.5–0.7 cm, villous. Scape wiry, villous, sheathing bract up to 1.8 cm long near centre and another below each ovary. Flowers 1–4, greenish white, reddish or deep red, *ca* 6–8 cm across, on pedicels including ovary 1.3–1.5 cm long; sepals very narrowly ovate, with filamentous, glandular hairy tips *ca* $\frac{2}{3}$ their length, 4–5.5 cm \times 0.2–0.3 cm, dorsal sepal incurved, lateral sepals divergent or lax; petals similar to sepals but shorter and slightly narrower; labellum white with red veins or wholly crimson, *ca* 5–6 mm long, entire, calli linear to clavate, in 2 rows to near bend; column *ca* 8 mm long, incurved, broadly winged; ovary 5–6 mm long, glandular puberulent.

Recorded from the Stanthorpe area of the Darling Downs district, on gravelly soils in eucalypt open forest. Flowers spring.

8. *Caladenia atroclavia* D. Jones & M. Clements

Caladenia fitzgeraldii auct. Qld non Rupp

Slender herb 10–25 cm tall. Leaf dull green, elliptic to narrowly ovate, 4–6 cm \times 0.6–0.8 cm, villous. Scape wiry, villous, with sheathing bract up to 1.6 cm long near middle and another below ovary; flower solitary, cream with pink and red suffusions, *ca* 4–5 cm across, on pedicels including ovary 2–2.8 cm long; sepals narrowly ovate, broad in basal two-thirds then narrowed, 3–3.3 cm \times 0.2–0.25 cm, apex with a prominent blackish osmophore *ca* 1.2 cm long, dorsal sepal erect, lateral sepals drooping, slightly divergent; petals narrowly ovate, falcate, acuminate, drooping, *ca* 2.7 cm \times *ca* 0.2 cm; labellum pink with a dark maroon midlobe, *ca* 1.3 cm long, obscurely 3-lobed, margin with short, linear teeth *ca* 1 mm long, midlobe recurved, distal margin entire, calli maroon to blackish, golf-stick type, in 4 rows extending just beyond bend; column *ca* 10 mm long, widely winged, with two cream basal glands; ovary *ca* 10 mm long, glandular puberulent.

Recorded from Girraween National Park in the Darling Downs district, on moist soils in eucalypt open forest. Flowers spring.

9. *Caladenia dilatata* R. Br.

GREENCOMB SPIDER ORCHID

Caladenia patersonii R. Br. var. *dilatata* (R. Br.) Benth.

Slender herb 15–40 cm tall. Leaf dull green, oblong to narrowly ovate, blotched red at base, 5–12 cm \times 1–2 cm, very villous. Scape wiry, villous, sheathing bract up to 2.5 cm long near centre and another below ovary; flowers solitary, rarely 2, green with yellow and maroon tonings, *ca* 6–8 cm across, on pedicels including ovary 1.5–2.5 cm long; sepals broad in basal quarter then narrowed, apex with a yellowish osmophore, 4.5–5.5 cm \times 0.2–0.35 cm, dorsal sepal erect, lateral sepals falcate, divergent or crossed; petals narrowly ovate, falcate, acuminate, 3–4 cm \times 0.2–0.35 cm; labellum whitish with green lateral lobes and maroon midlobe, *ca* 2.5–3.5 cm long, lateral lobes erect, margin deeply divided into 3–6 long acuminate teeth, midlobe recurved, margin toothed, calli maroon, golf-stick type, in 4 rows extending just beyond bend; column *ca* 1.5 cm long, incurved, widely winged, with two large yellow basal glands; ovary 0.8–1.2 cm long, glandular puberulent.

Common in the Stanthorpe area of the Darling Downs district, on gravelly soils in open eucalypt forest. Flowers spring.

19. GLOSSODIA R. Br.

Slender terrestrial herbs with small tubers, usually hairy. Leaf solitary, radical, \pm prostrate, oblong or narrowly ovate. Flowers 1 or 2, rarely more, on erect scape; sepals

and petals nearly equal, all spreading; labellum much shorter, sessile, undivided with entire margin, without calli along disc but with two sometimes fused tall, linear-clavate calli at base, erect against column; column erect, often incurved, 2-winged; anther erect, 2-locular, outer valves broad, inner much smaller, connective produced into a small point, pollinia 4, glandular.

2 species endemic in Australia, both occurring in south-eastern Queensland.

- | | |
|--|--------------------|
| 1. Sepals and petals 1.5–3 cm long; calli at base of labellum fused, with a 2-lobed head | 1. <i>G. major</i> |
| Sepals and petals 0.8–1.5 cm long; calli at base of labellum not fused, clavate | 2. <i>G. minor</i> |

1. *Glossodia major* R. Br.

WAX LIP

Glossodia major var. *alba* McKibbin; *Caladenia major* (R. Br.) H.G. Reichb.

Slender erect herb. Leaf narrowly oblong-elliptic or narrowly oblong-ovate, apex acuminate, base sheathing, cordate to cuneate, 2–12(–15) cm × 0.6–1.6 cm, villous, drying with a vanilla perfume. Scapes up to 30 cm tall, villous towards base, pubescent towards apex, with a sheathing bract at or below middle, another under flower, both up to ca 1.2 cm long, pedicel including ovary 0.7–1.7 cm long; flowers purplish or occasionally all white; sepals and petals ovate to elliptic, apex blunt, 1.3–3 cm × 0.4–0.9 cm, glandular papillose; labellum ovate, 0.7–1.2 cm × 0.4–0.6 cm, basal part white, dilated laterally into 2 papillose areas with a furrow between, anterior part purple, glabrous, at base with large erect purple callus ca 3–4 mm long with hammer-like apex, reflexed just below apex; column incurved, 0.6–1 cm long, wings 2–4 mm wide at apex; ovary 0.6–1.4 cm long, glandular pubescent. Capsules narrowly obovoid.

Scattered in the region in open forest, e.g. Stanthorpe area, Brisbane environs, Maryborough area. Flowers late winter–spring.

2. *Glossodia minor* R. Br.

SMALL WAX LIP

Caladenia minor (R. Br.) H. G. Reichb.; *C. minor* var. *alba* F. M. Bailey; *Glossodia orientalis* F. Muell. nom. illeg.; *C. glossodia* F. Muell. nom. illeg.

Slender erect herb up to 16 cm tall. Leaf ovate to oblong-ovate, apex acute, base stem-clasping, 1.2–4.5 cm × 0.3–1.1 cm, villous. Scapes up to 20 cm tall, lower part villous pubescent towards apex with a sheathing bract at or below middle, another under flower, both 5–10 mm long, pedicels including ovary 0.8–1.8 cm long; flowers 1 or 2, deep violet-blue, rarely white; sepals and petals ovate to elliptic, apex blunt, 0.8–1.5 cm × 0.25–0.6 cm, sometimes glandular puberulent; labellum ovate acuminate, 3–5 mm long, papillose area in middle of lower part with smooth margin on either side, anterior part somewhat channelled, base with 2 large club-shaped calli ca 3 mm long, united at base; column 4–6 mm long, erect, wings 1.5–2 mm wide towards apex; ovary 4–7 mm long, glandular pubescent. Capsules narrowly ovoid. **Fig. 56F.**

Moreton, Wide Bay and Darling Downs districts, on poor sandy soils in heath or open forest with heathy understorey. Flowers winter–spring.

20. *MICROTIS* R. Br.

Deciduous terrestrial herbs with globular tuberoids. Leaf solitary, arising directly from tuberoid, usually ± erect, hollow-terete. Inflorescences racemose, developed within base of hollow leaf and forcing its way out of leaf at varying points along its length; flowers very small, not reversed; dorsal sepal ± cucullate, lateral sepals free; labellum sessile at base of column, usually ± oblong, with 2 raised callosities at base, sometimes at apex also; column short and broad, wings arising from near apex; anther erect, 2-locular, pollinia 2, 2-lobed, granular, caudicle usually present; stigma prominent.

10–14 species, eastern Asia, Malaysia, Australia, New Zealand, Polynesia; 9 species Australia; 3 species south-eastern Queensland.

- | | | |
|--|-------------------------|---|
| 1. Upper surface of labellum with 2 callosities at base but none at apex | 1. <i>M. parviflora</i> | |
| Upper surface of labellum with 2 callosities at base and 1 at apex | | 2 |

- | | |
|---|-----------------------|
| 2. Ovary turgid; labellum \pm half as long as ovary; flowers crowded | 2. <i>M. unifolia</i> |
| Ovary slender; labellum $\pm \frac{2}{3}$ as long as ovary; flowers not crowded | 3. <i>M. rara</i> |

1. *Microtis parviflora* R. Br.

SLENDER ONION ORCHID

Microtis holmesii Nicholls; *M. bipulvinaris* Nicholls

Usually slender herb up to 60 cm tall. Leaf usually longer than raceme. Racemes densely flowered towards apex, pedicels including ovary 3–5 mm long, subtending bracts acuminate, 1.5–4 mm long; flowers pale green or golden green; dorsal sepal ovate-cucullate, apex contracted into sharp point, 1.5–2.5 mm \times 1–1.5 mm, lateral sepals ovate to oblong, decurved, 1.5–2 mm \times 0.5–1 mm; petals oblong, obtuse, ca 1.5 mm \times ca 0.5 mm; labellum ovate or oblong-ovate, decurved, obtuse, margin entire, ca 1–1.5 mm \times ca 1 mm, callosities 2, 1 either side near base; column ca 1 mm long, wings not extending as high as top of anther. Capsules obloid to \pm ellipsoid, 3–5 mm long.

Scattered throughout the region, in moist grassland in open forest or swampy areas. Flowers spring.

2. *Microtis unifolia* (G. Forster) H. G. Reichb.

COMMON ONION ORCHID

Ophrys unifolia G. Forster; *Epipactis porrifolia* Swartz; *Microtis porrifolia* (Swartz) R. Br. ex Sprengel; *M. banksii* J. D. Hook.; *M. pulchella* Lindl.; *M. arenaria* Lindl.; *M. pulchella* var. *vivax* Lindl.; *M. frutetorum* Schlechtendal; *M. longifolia* Colenso; *M. papillosa* Colenso; *M. biloba* Nicholls

Erect herb up to 60 cm tall. Leaf often longer than raceme. Racemes densely flowered towards apex, pedicels including ovary 2.5–5 mm long, subtending bracts acuminate, 2–4 mm long; flowers pale green or golden green; dorsal sepal ovate-cucullate, apex shortly

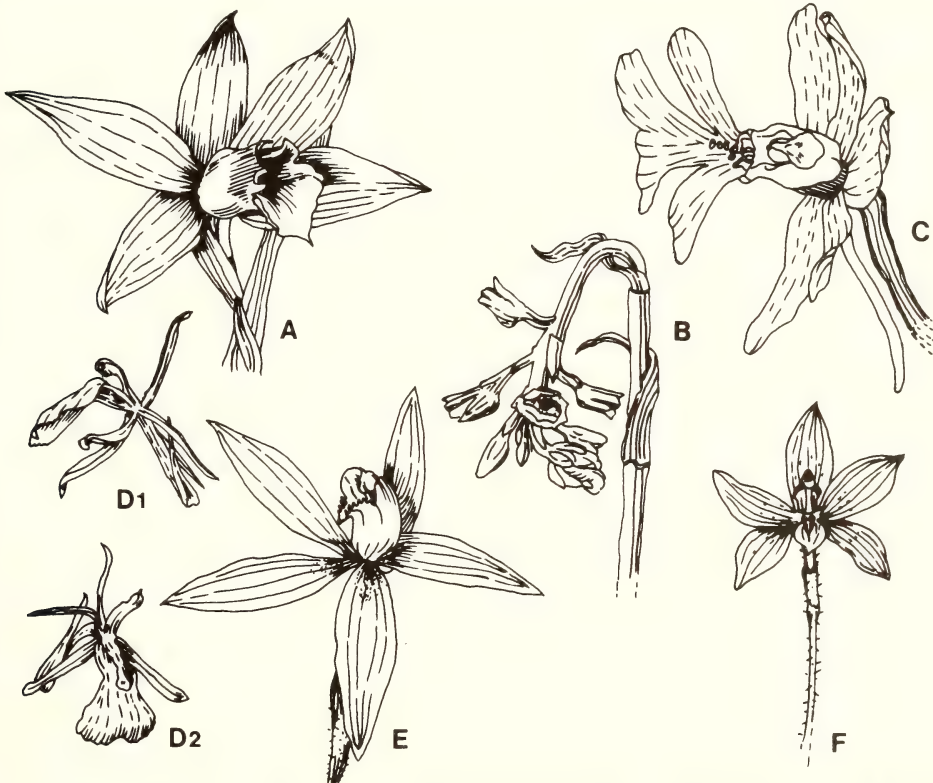


Fig. 56 ORCHIDACEAE — **A** *Phaius tancarvilleae*, flower showing inrolled labellum $\times \frac{1}{2}$; **B** *Geodorum neocaledonicum*, habit $\times \frac{1}{2}$; **C** *Calanthe triplicata*, flower from above, showing 3-lobed labellum $\times 1$; **D**₁–**D**₂ *Liparis coelogyne*, flower, **D**₁ side view, **D**₂ front view, both $\times 1\frac{1}{2}$; **E** *Caladenia carnea*, flower $\times 1\frac{1}{2}$; **F** *Glossodia minor*, flower $\times 1$.

abruptly acuminate, *ca* 2 mm \times *ca* 1.5 mm, lateral sepals deflexed, *ca* 2 mm \times *ca* 0.5–0.75 mm; petals *ca* 1.2 mm \times *ca* 0.5 mm; labellum \pm oblong, decurved, apex obtuse, almost truncate to broadly emarginate, margin crenulate, *ca* 1.2–1.5 mm \times *ca* 0.8 mm, callosities 3, one on either side near base, 1 near apex; column *ca* 1 mm long, wings not extending as high as top of anther. Capsules obloid, or shorter ones obovoid, 3–5 mm long. **Fig. 57D.**

Mainly coastal districts, commonly found in moist open grasslands or on edges of swamps. Flowers winter–spring.

3. *Microtis rara* R. Br. SCENTED ONION ORCHID

Microtis unifolia (G. Forster) H. G. Reichb. var. *rara* (R. Br.) H. G. Reichb.; *M. viridis* F. Muell.; *M. brownii* H. G. Reichb.; *M. truncata* R. Rogers; *M. oblonga* R. Rogers; *M. magnadenia* R. Rogers

Erect herb up to 60 cm tall. Leaf up to 50 cm long. Racemes densely flowered, slender, pedicels including ovary 2.5–5 mm long, subtending bracts acuminate, 3–4 mm long; flowers pale green; dorsal sepal ovate-cucullate, apex shortly apiculate, *ca* 4 mm \times *ca* 2 mm, lateral sepals linear-oblong, divergent or revolute, *ca* 3 mm \times *ca* 0.8 mm; petals narrowly ovate, falcate, widely divergent, *ca* 2–2.5 mm \times *ca* 0.8 mm; labellum \pm oblong, constricted near middle, deflexed against ovary, apex truncate to emarginate, margin crenulate, *ca* 3–4 mm \times *ca* 1–1.5 mm, callosities 3, one on either side near base, often joined and saddle-shaped, one near apex; column *ca* 1 mm long, wings prominent, extending nearly as high as anther. Capsules ellipsoid, 3–5 mm long.

Mainly coastal districts, commonly found in moist grasslands and around the edges of depressions. Flowers winter–spring.

21. PRASOPHYLLUM R. Br.

Deciduous terrestrial glabrous herbs usually with ovoid or globular tuberooids. Leaf solitary, arising directly from tuberooid, usually \pm erect, hollow-terete. Inflorescences racemose, developing within base of hollow leaf and forcing its way out of leaf at varying points along its length; flowers reversed; dorsal sepal concave on inside, lateral sepals free or \pm connate; labellum sessile and fixed to base of column, undivided, disc with raised longitudinal callus usually surrounded by membranous undulate to crisped margin; column short, often indistinct, with a variable lateral wing on either side; anther 2-locular, erect behind stigma, pollinia 2, 2-lobed, caudicles present.

40–50 species Australia and New Zealand; *ca* 43 species Australia, 1 possibly extinct; 8 species south-eastern Queensland.

1. Ovary terete, appressed to rachis	2
Ovary ovoid, projecting away from rachis	4
2. Flowers yellowish; leaf purplish, free part of blade <i>ca</i> 2.5 cm long	1. <i>P. flavum</i>
Flowers greenish, brownish or purplish; leaf green or purplish, free part of blade more than 10 cm long	3
3. Labellum sharply reflexed about the middle, callus extending to the bend	2. <i>P. australe</i>
Labellum curved gently, callus extending halfway between the bend and tip of lamina	3. <i>P. elatum</i>
4. Labellum callus very thick and fleshy, prominent, extending nearly to apex of lamina	4. <i>P. constrictum</i> sens. lat.
Labellum callus raised, but hardly thick or fleshy, extending to the bend or halfway between the bend and apex of lamina	5
5. Callus extending well beyond the bend in labellum (<i>ca</i> halfway between bend and apex)	5. <i>P. sp. 1.</i>
Callus extending to the bend in labellum or just beyond	6
6. Labellum recurved gently at <i>ca</i> 60–90°	6. <i>P. patens</i>
Labellum recurved sharply at more than 90°	7

7. Reflexed distal part of labellum folding back sharply, often touching base; plants scentless
 Reflexed distal part of labellum never folded or touching the base, apex often protruding through lateral sepals; plants strongly scented

7. *P. brevilabre*
 8. *P. odoratum*

1. *Prasophyllum flavum* R. Br.

YELLOW LEEK ORCHID

Slender to robust plant up to 80 cm tall. Leaf usually purplish, often white or yellowish at base, up to 60 cm long, closely sheathing, free part of blade up to 25 cm long. Flowers 6–50 in a fairly crowded spike, yellow or yellowish green, sometimes with reddish brown markings, *ca* 1 cm across; ovary terete, *ca* 1.2 cm long, appressed; dorsal sepal narrowly ovate, concave, deflexed, acute, *ca* 10 mm \times *ca* 4 mm, lateral sepals usually connate throughout, sometimes free, narrowly ovate, erect, acute, *ca* 10 mm \times *ca* 4 mm; petals with a central dark stripe, narrowly ovate, spreading or incurved, acute, *ca* 10 mm \times *ca* 3 mm; labellum sessile, whitish, cream or greenish, narrowly ovate, gibbous at base, curved upwards or recurving gently above middle, margin intensely crisped, *ca* 8 mm \times *ca* 3.5 mm, callus green, raised, extending nearly to apex of lamina; column \pm horizontal, lateral appendages \pm deltoid, obtuse, sometimes rugose, much shorter than rostellum, basal lobe thickened; pollinia 2, orange-yellow, sectile, bilobed; viscidium narrowly elliptic; stigma scutiform.

Recorded from southern Darling Downs district on gravelly soils in light forest, e.g. Glen Aplin. Flowers summer.

2. *Prasophyllum australe* R. Br.

AUSTRAL LEEK ORCHID

Prasophyllum lutescens Lindl.; *P. australe* var. *viscidum* R. Rogers

Robust plant up to 75 cm tall. Leaf dark green, reddish at the base, terete, up to 35 cm long, free part of blade up to 30 cm long. Flowers crowded, sessile, 15–60 in a dense spike, greenish with reddish brown stripes and suffusions and a glistening white labellum, fragrant, *ca* 1.5 cm across, ovary terete, *ca* 1 cm long, appressed; dorsal sepal ovate to narrowly ovate, concave, deflexed, acute to acuminate, *ca* 8 mm \times *ca* 3.5 mm, lateral sepals connate almost to tips, sometimes free at the very base, sometimes nearly all free, \pm ovate, erect, *ca* 8 mm \times *ca* 2 mm; petals yellowish green with a prominent brownish central stripe, narrowly ovate, acute, *ca* 6 mm \times *ca* 1.5 mm; labellum sessile, conspicuously crystalline-white, oblong-obovate, base gibbous, erect, sharply reflexed about the middle, margin undulate to strongly crisped, *ca* 8 mm \times 3.5–4 mm, callus channelled, extending to bend in lamina, ending in two raised lumps or knuckles; column \pm horizontal, lateral appendages narrowly ovate, falcate, equal in height to rostellum, basal lobe thickened, sinuous; pollinia 2, yellow, sectile, bilobed; viscidium white, ovate, large; stigma large, 5-sided.

Moreton and Wide Bay districts, on moist to wet soils, e.g. Lamington National Park, Cooloola area, near Buderim. Flowers spring–early summer. Forms colonies and flowering is promoted by fires.

3. *Prasophyllum elatum* R. Br.

TALL LEEK ORCHID

Prasophyllum macrotys Lindl.

Robust plant to more than 1 m tall, but usually less than 80 cm in Queensland specimens. Leaf green to purplish black, terete, up to 60 cm long, free part of blade up to 20 cm long. Flowers sessile, 15–60 in a dense spike, yellowish green, brownish or purplish black with a white labellum, fragrant, *ca* 1.6 cm across, ovary terete, *ca* 1.2 cm long, appressed; dorsal sepal narrowly ovate, concave, deflexed, acute, *ca* 1–1.1 cm \times 0.3–0.35 cm, lateral sepals connate in distal half, narrowly ovate, erect, \pm falcate, *ca* 10 mm \times *ca* 3 mm; petals narrowly ovate, incurved or spreading, falcate, *ca* 10 mm \times *ca* 2 mm; labellum sessile, crystalline-white, ovate, not gibbous at base, curved gently to *ca* 90° near middle, margin undulate to strongly crisped, *ca* 9–10 mm \times 5–6 mm, callus ridged at base, extending half way between bend and tip of lamina, raised, margin undulate to crenulate; column \pm horizontal, lateral appendages linear, falcate, obtuse, longer than rostellum, basal lobe thickened; pollinia 2, yellow, sectile, deeply bilobed; viscidium white, ovate, large; stigma rounded to scutiform.

Coastal areas of Moreton and Wide Bay districts, usually on sandy soils, in open forest and heaths, e.g. Burleigh Heads, Noosa, Maryborough areas. Flowers spring. Flowering is stimulated by fires.

4. *Prasophyllum constrictum* R. Rogers sens. lat.*Prasophyllum gracile* R. Rogers nom. illeg.

Slender plant *ca* 45 cm tall. Leaf green, terete, up to 30 cm long, free part up to 20 cm long, often withered at flowering time. Flowers sessile, 15–*ca* 40 in a fairly dense spike, yellowish green to brownish with purplish or reddish brown stripes and suffusions, fragrant, *ca* 1.2 cm across, ovary ovoid, turgid, *ca* 6 mm long, projecting; dorsal sepal narrowly ovate, deflexed or recurved, hardly cucullate, *ca* 10 mm \times *ca* 4 mm, lateral sepals free, widely divergent, not gibbous at base, often recurved, apex acute or toothed, *ca* 1.2 cm \times *ca* 0.3 cm; petals faintly striped, linear-ovate, widely spreading, acute, *ca* 10 mm \times *ca* 2 mm; labellum sessile to subsessile, white or pinkish, recurved at *ca* 90° in upper half, margin crisped, sometimes reflexed behind callus, *ca* 7 mm \times *ca* 4 mm, callus green or brown, raised, very thick and fleshy, extending nearly to apex; column \pm horizontal, lateral appendages whitish, linear-ovate, falcate, obtuse, slightly shorter than rostellum, basal lobe deltoid; pollinia 2, yellow, sectile, \pm bifid; viscidium white, \pm cordate; stigma green, cordate.

Western Moreton district on moist soils and swamps. Flowers spring–early summer.

This taxon is part of a complex that requires clarification.

5. *Prasophyllum* sp. 1.

Slender plant up to 38 cm tall. Leaf green, terete, up to 33 cm long, free part up to 15 cm long. Flowers sessile, 12–18 in a short crowded spike, greenish white with a white labellum, fragrant, *ca* 1.2 cm across, ovary ovoid, turgid, *ca* 8 mm long, projecting; dorsal sepal ovate to narrowly ovate, deflexed, concave, acuminate, *ca* 7 mm \times *ca* 2 mm, lateral sepals connate in proximal two-thirds, narrowly ovate, erect, *ca* 7 mm \times *ca* 2 mm; petals spreading, linear, acuminate, with a dark central band, *ca* 5 mm \times *ca* 1 mm; labellum sessile, white, ovate to narrowly ovate, recurved sharply in upper half, margin undulate to crisped, *ca* 7 mm \times *ca* 3 mm, callus green, raised, extending halfway between bend and tip of lamina; column \pm horizontal, lateral appendages linear, falcate, obtuse to truncate, \pm equal to rostellum.

Recorded from coastal areas in Moreton and Wide Bay districts on wallum and stabilized dunes, e.g. Noosa–Coolool area. Flowers spring.

6. *Prasophyllum patens* R. Br.**BROAD LIP LEEK ORCHID**

Prasophyllum album R. Rogers; *P. odoratum* R. Rogers var. *album* (R. Rogers) R. Rogers; *P. rotundiflorum* R. Rogers

Slender plant up to *ca* 45 cm tall in Queensland specimens. Leaf green, terete, up to 30 cm long, free part up to 15 cm long. Flowers sessile to subsessile, 15–*ca* 50, well spaced or in a crowded spike, greenish with a white labellum, not fragrant, *ca* 1.2 cm across, ovary ovoid, turgid, *ca* 7 mm long, projecting; dorsal sepal narrowly ovate, deflexed or recurved, *ca* 7 mm \times *ca* 3 mm, lateral sepals free, narrowly ovate, parallel or divergent, not gibbous at base, apex acute or toothed, *ca* 8 mm \times 1.5–2 mm; petals white or pinkish, linear, spreading, subacute, *ca* 6 mm \times *ca* 1 mm; labellum sessile to subsessile, crystalline-white, narrowly ovate, recurved at *ca* 60–90° near middle, margin wavy to crisped, *ca* 6–8 mm \times *ca* 4 mm, callus green, raised, extending just beyond bend; column \pm horizontal, lateral appendages linear-oblong, obtuse or notched, shorter than rostellum, basal lobe small, rounded; pollinia 2, yellow, sectile, bifid; viscidium white, ovate-deltoid; stigma reniform. **Fig. 57A.**

Coastal areas of Moreton and Wide Bay districts in heaths and light forest, e.g. Fraser I., Moreton I., Stradbroke I. Flowers spring.

7. *Prasophyllum brevilabre* (Lindl.) J. D. Hook.

Prasophyllum lutescens Lindl. var. *brevilabre* Lindl.

Slender plant up to 45 cm tall, but often only 15–25 cm tall in Queensland specimens. Leaf green, terete, up to 35 cm long, free part \pm erect, up to 8 cm long. Flowers sessile, 8–32 in a slender loose spike, green with dark reddish markings and a white labellum, not fragrant, *ca* 10 mm across, ovary ovoid, turgid, *ca* 8 mm long, projecting; dorsal sepal ovate, cucullate, incurved or deflexed, *ca* 8 mm \times 3–4 mm, lateral sepals usually connate

- | | | |
|---|--------------------------------|----|
| 4. Flowers strongly deflexed, densely crowded, dark purplish red; labellum margin sparsely ciliate | 2. <i>G. trifidum</i> | |
| Flowers spreading to hardly deflexed, fairly crowded, light reddish purple; labellum margin densely ciliate | 3. <i>G. sp. 2.</i> | |
| 5. Labellum broadly ovate to broadly elliptic, nearly as broad as long | 4. <i>G. archeri</i> | |
| Labellum narrowly ovate to narrowly oblong or very narrowly ovate, much longer than broad | | 6 |
| 6. Labellum margin and anterior lobe of column with a dense fringe of fine white cilia | 5. <i>G. plumosum</i> | |
| Labellum with hairs coarse, dark coloured, often tangled, not present in a dense fringe | | 7 |
| 7. Labellum callus extending less than halfway to apex of lamina | 6. <i>G. parvicallum</i> | |
| Labellum callus extending nearly to apex of lamina | | 8 |
| 8. Flowers \pm drooping; lateral sepals deflexed, segment tips long acuminate | 7. <i>G. acuminatum</i> | |
| Flowers spreading, deflexed only past anthesis; lateral sepals recurved in basal third, erect segment tips acute to acuminate | | 9 |
| 9. Labellum hairs pink; flowers lemon scented | 8. <i>G. fimbriatum</i> | |
| Labellum hairs purple; flowers lacking obvious perfume | 9. <i>G. morrisii</i> | |
| 10. Flowers green to yellowish green, sometimes with a few red markings | 10. <i>G. pumilum</i> | |
| Flowers reddish to purple, if green then labellum reddish to purple | | 11 |
| 11. Petals with a prominent white apical gland; flowers light reddish brown | 11. <i>G. sp. 3.</i> | |
| Petals lacking an apical gland; flowers purplish or green with a reddish to purple labellum | | 12 |
| 12. Flowers green with a reddish to purple labellum; labellum apex filiform to caudate | 12. <i>G. sp. 4.</i> | |
| Flowers purplish; labellum apex obtuse to acute or mucronate | | 13 |
| 13. Labellum margin irregularly lacerated | 13. <i>G. sp. 5.</i> | |
| Labellum margin entire, undulate or crenulate to denticulate, never lacerated | | 14 |
| 14. Apex of dorsal sepal long acuminate to caudate; labellum callus red or green and red | 14. <i>G. sp. 6.</i> | |
| Apex of dorsal sepal acuminate, sometimes gland-tipped; labellum callus purplish black to black | 15. <i>G. rufum</i> sens. lat. | |

1. *Genoplesium* sp. 1.

Very slender plant up to 25 cm tall. Leaf blade subulate, *ca* 1.5 cm long, loosely sheathing, ending close to spike. Flowers spreading, 10–25 in a fairly crowded spike, yellowish green with a purplish red labellum, ovary curved, *ca* 2 mm long, subtending bracts ovate, *ca* 0.5 mm long; dorsal sepal ovate, cucullate, deflexed, apex acuminate, margin reddish purple, shortly ciliate, *ca* 2 mm \times *ca* 0.8 mm, lateral sepals linear-ovate, divergent, gibbous at base, recurved in distal half, apex acuminate, *ca* 3 mm \times *ca* 1 mm; petals ovate, divergent, apex long acuminate, margin dark purplish red, shortly ciliate, *ca* 1.5 mm \times *ca* 0.8 mm; labellum articulate on column foot, dark purplish red, \pm oblong, apex acute to acuminate, margin with numerous short cilia, *ca* 3 mm \times *ca* 1 mm, callus raised, of two dark \pm clavate plates, apex bifid, extending about halfway along lamina; column *ca* 2 mm long with foot *ca* 0.5 mm long, curved, wings broad, bifid in distal half, anterior lobe purplish, long acuminate-filiform, posterior lobe white, deltoid; anther cap rostrate, *ca* 1 mm long; stigma orbicular, *ca* 0.5 mm across.

Helidon area in the Moreton district, on shallow soil over sandstone. Flowers summer–autumn.

2. *Genoplesium trifidum* (Rupp) D. Jones & M. Clements

Prasophyllum trifidum Rupp

Slender plant up to 30 cm tall. Leaf blade subulate, *ca* 1.5 cm long, closely sheathing,

ending close to spike. Flowers sessile, 10–35 in a densely crowded spike, dark purplish red but buds green, deflexed, ovary curved, *ca* 2 mm long, subtending bracts ovate, *ca* 1 mm long; dorsal sepal broadly ovate, cucullate, deflexed, apex acuminate to mucronate, *ca* 3 mm \times *ca* 2 mm, lateral sepals \pm oblong, divergent, prominently gibbous at base, apex bluntly acute, sometimes gland-tipped, distal margin incurved, *ca* 4 mm \times *ca* 1.3 mm; petals ovate, projected forwards or divergent, apex with a prominent curved white gland, *ca* 2 mm \times *ca* 1 mm; labellum articulate on column foot, ovate-obovate, spreading, apex recurved, mucronate, margin in distal half with very short cilia, *ca* 2 mm \times *ca* 1.5 mm, callus black, very thick and fleshy, narrowly ovate, constricted before apex, channelled for two-thirds its length, ending just before apex of lamina; column *ca* 2 mm long with foot *ca* 0.5 mm long, curved, wings fairly broad, apex bifid or trifid, anterior lobe shortest, acute, posterior lobe curved, obtuse, anther cap shortly rostrate, *ca* 1.2 mm long; stigma orbicular, \pm 0.5 mm across. **Fig. 57C.**

Coastal heathland on white sands; common in the Noosa–Cooloola sand belt. Flowers autumn–winter.

3. *Genoplesium* sp. 2.

Very slender plant up to 18 cm tall. Leaf blade subulate, margin involute, *ca* 1.5 cm long, loosely sheathing, ending close to spike. Flowers 5–20 in a fairly crowded spike, reddish purple and green, spreading to deflexed, ovary *ca* 2 mm long, subtending bracts ovate, *ca* 0.5 mm long; dorsal sepal broadly ovate, cucullate, deflexed, apex bluntly acuminate, *ca* 2.5 mm \times *ca* 1.5 mm, lateral sepals narrowly ovate, divergent, gibbous at base, not recurved in distal half, apex acute or with a small gland, *ca* 4 mm \times *ca* 1 mm; petals ovate, \pm falcate, divergent, apex with a prominent twisted white gland, *ca* 2 mm \times *ca* 0.7 mm; labellum articulate on column foot, dark purplish red, ovate-obovate, apex acute, margin with dense short cilia, *ca* 2.2 mm \times *ca* 1.5 mm, callus thick, fleshy, narrowly cordate, somewhat constricted in basal third, papillate, extending nearly to apex of lamina; column *ca* 1.5 mm long with foot *ca* 1 mm long, \pm curved, wings broad, bifid in distal half, anterior lobe longest, acuminate, denticulate, posterior lobe \pm deltoid, smooth; anther cap shortly rostrate, *ca* 1 mm long; stigma orbicular, *ca* 0.5 mm across.

Recorded from Lamington National Park under low shrubs. Flowers summer.

4. *Genoplesium archeri* (J. D. Hook.) D. Jones & M. Clements

Prasophyllum archeri J. D. Hook.; *P. intricatum* C. Stuart ex Benth.

Very slender plant up to 20 cm tall. Leaf blade narrowly ovate, apex subulate, margin involute, *ca* 1–2 cm long, closely sheathing, just reaching the bottom flowers. Flowers subsessile, 5–20 in a short congested spike, in Queensland material wholly deep purple, ovary *ca* 3 mm long, subtending bracts ovate, *ca* 1 mm long; dorsal sepal purplish with 3–5 darker stripes, ovate, cucullate, deflexed, apex acuminate, *ca* 4 mm \times *ca* 2 mm, lateral sepals projected forwards in proximal 1 mm where connate, then recurved, narrowly ovate, erect and divergent, apex subacute, distal margin incurved, *ca* 5 mm \times *ca* 1 mm; petals with 3 darker stripes, ovate, projected forward or spreading, acuminate, *ca* 3 mm \times *ca* 1 mm; labellum articulate on column foot, broadly ovate to broadly elliptic, projected forwards, apex acute or mucronate, basal margin usually upturned, margin in distal two-thirds with coarse spreading cilia 0.5–1 mm long, *ca* 3 mm \times *ca* 2 mm, callus dark purplish black, raised, fleshy, broadest at base and tapered, central part channelled, ending near apex of lamina; column *ca* 2.5 mm long with foot *ca* 0.5 mm long, curved, wings broad, bifid for distal third, anterior lobe broad, papillate, distal margin ciliate, posterior lobe narrow, \pm smooth, entire; anther cap rostrate, *ca* 1 mm long; stigma scutiform, *ca* 0.5 mm across.

Girraween National Park and Stanthorpe area in the Darling Downs district, on shallow soil on granite boulders, also Noosa and Maryborough areas in the Wide Bay district, on moist sandy soil. Flowers late summer–autumn.

5. *Genoplesium plumosum* (Rupp) D. Jones & M. Clements

Prasophyllum plumosum Rupp

Slender plant up to 28 cm tall. Leaf blade subulate, *ca* 1.5 cm long, closely sheathing, ending close to spike. Flowers sessile, 3–9 in an open spike, green to yellowish green with

red markings and white hairs, spreading to deflexed, ovary curved, *ca* 3 mm long, subtending bracts ovate, *ca* 1.5 mm long; dorsal sepal lightly striped, ovate, cucullate, deflexed, apex long acuminate, *ca* 7 mm \times *ca* 3 mm, lateral sepals spreading, divergent, apex bluntly acute, distal margin incurved, *ca* 7.5 mm \times *ca* 1.5 mm; petals striped, ovate to narrowly ovate, projected forwards, apex long acuminate, *ca* 5 mm \times *ca* 1.5 mm; labellum articulate on column foot, reddish brown, narrowly ovate, spreading, flat, apex acuminate, margin in distal half densely fringed with long white spreading cilia *ca* 0.4 mm long, *ca* 4 mm \times *ca* 1 mm, callus hardly raised, narrowly ovate, extending nearly to apex of lamina; column *ca* 2 mm long with foot *ca* 0.5 mm long, curved, wings broad, *ca* 1.5 mm long, bifid in distal half, anterior lobe longest, pink, acuminate, with long dense white cilia similar to those on labellum margin, posterior lobe pale, smooth; anther cap shortly rostrate, *ca* 1 mm long; stigma teardrop-shaped, *ca* 0.5 mm across.

Reported to occur south of Stanthorpe in the Darling Downs district, but confirmatory specimens lacking; grows on shallow soil among rocks. Flowers summer–autumn.

6. *Genoplesium parvicallum* (Rupp) D. Jones & M. Clements

Prasophyllum parvicallum Rupp

Slender plant up to 30 cm tall. Leaf blade with involute margin, *ca* 2 cm long, closely sheathing, situated well below spike. Flowers sessile, 20–26 in a fairly open spike, greenish with purple-brown stripes, spreading to partially drooping, ovary *ca* 2.5 mm long, subtending bracts *ca* 1 mm long; dorsal sepal striped, ovate, cucullate, deflexed, apex acuminate, margin shortly ciliate, *ca* 4 mm \times *ca* 2 mm, lateral sepals linear-ovate, spreading, divergent, apex acute, *ca* 5–6 mm \times *ca* 1 mm; petals striped, narrowly ovate, spreading, acuminate, margin shortly ciliate, *ca* 3 mm \times *ca* 0.5 mm; labellum articulate on column foot, linear-ovate, spreading or obliquely erect, slightly contracted near middle, apex recurved, acuminate, margin with coarse cilia *ca* 0.5 mm long, *ca* 4 mm \times *ca* 1 mm, callus hardly raised, clavate, ending before middle of lamina; column *ca* 2 mm long with foot *ca* 0.5 mm long, wings narrow, *ca* 1.3 mm long, bifid in distal half, both lobes acuminate, glabrous, anterior lobe longest; anther cap with a curved rostrum *ca* 0.3 mm long, *ca* 1 mm long; stigma *ca* 0.5 mm across.

Known only from a rocky ledge on the top of Mt Greville in the Moreton district, among thick clumps of grass. Flowers summer.

7. *Genoplesium acuminatum* (R. Rogers) D. Jones & M. Clements

Prasophyllum acuminatum R. Rogers

Very slender plant up to 30 cm tall. Leaf blade with acuminate apex, margin involute, *ca* 1.5 cm long, closely sheathing, situated well below spike. Flowers sessile, 5–20 in a fairly open spike, greenish to dark reddish brown with darker stripes, \pm deflexed, ovary curved, *ca* 2 mm long, rugose, subtending bracts ovate, *ca* 1 mm long; dorsal sepal greenish with 3–5 purple-brown stripes, ovate, cucullate, deflexed, apex long acuminate, margin coarsely ciliate, *ca* 5 mm \times *ca* 2 mm, lateral sepals spreading or obliquely deflexed, divergent, narrowly ovate, long tapered to obtuse apex, apical gland usually present, *ca* 5 mm \times *ca* 1 mm; petals with 3–5 darker stripes, ovate, spreading, acuminate, margin coarsely ciliate, *ca* 3 mm \times *ca* 1 mm; labellum articulate on column foot, narrowly ovate, deflexed, apex long acuminate, recurved, margin with coarse spreading dark cilia *ca* 1 mm long, *ca* 3 mm \times *ca* 1.25 mm, callus dark purple, raised, fleshy, broadest at base then tapered, proximal central part shallowly channelled, apex bilobed, ending just above middle of lamina; column *ca* 2 mm long with foot *ca* 0.5 mm long, curved, wings bifid in distal half, anterior lobe longest, acuminate, ciliate, posterior lobe obtuse or truncate, smooth; anther cap rostrate, *ca* 1 mm long; stigma scutiform, *ca* 0.5 mm across. **Fig. 57B.**

Recorded in coastal districts north of Brisbane on sandy soils in heathland. Flowers autumn, rarely spring.

8. *Genoplesium fimbriatum* (R. Br.) D. Jones & M. Clements

FRINGED MIDGE
ORCHID

Prasophyllum fimbriatum R. Br.; *P. anomalum* Rupp; *P. bowdeniae* Rupp

Robust slender plant up to 60 cm tall, usually 20–30 cm tall. Leaf blade subulate, margin involute, *ca* 2 cm long, closely sheathing, situated well below spike. Flowers sessile, 5–27

in a fairly open spike, green with crimson stripes and prominent pink hairs, lemon scented, spreading, ovary curved, *ca* 2.5 mm long, smooth, subtending bracts ovate, *ca* 1.5 mm long; dorsal sepal greenish with 4 crimson stripes and margins, ovate to narrowly ovate, cucullate, deflexed, apex acute to acuminate, margin coarsely ciliate, *ca* 4–5 mm \times 2–2.5 mm, lateral sepals narrowly ovate, gibbous at base, erect, divergent, apex bluntly acute, distal margin incurved, *ca* 5–6 mm \times *ca* 1.5 mm; petals with 3 crimson stripes, ovate, spreading, acuminate, margin coarsely ciliate, *ca* 3 mm \times 0.5–1 mm; labellum articulate on column foot, linear-oblong, sometimes contracted near middle, spreading or obliquely erect in a shallow sigmoidal curve, apex recurved, acuminate, margin with coarse pink to purple, spreading or tangled cilia up to 1.3 mm long, *ca* 4–4.5 mm \times *ca* 1 mm, callus often greenish towards base and darker at apex, hardly raised, linear to linear-tapered, central part shallowly channelled, apex \pm notched, ending \pm 1 mm from apex of lamina; column *ca* 2 mm long with foot *ca* 0.7 mm long, curved, papillate, wings narrow, *ca* 2 mm long, bifid in distal third, anterior lobe acuminate, shortly ciliate, posterior lobe linear, blunt, smooth; anther cap with a curved rostrum *ca* 0.3 mm long, *ca* 1.2 mm long; stigma teardrop-shaped, *ca* 0.5 mm across.

Recorded from Girraween National Park in the Darling Downs district, on shallow soil on granite boulders. Flowers late summer–autumn.

9. *Genoplesium morrisii* (Nicholls) D. Jones & M. Clements

BEARDED MIDGE
ORCHID

Prasophyllum morrisii Nicholls; *P. morrisii* var. *contortum* Nicholls

Slender plant up to 36 cm tall. Leaf blade subulate, margin involute, *ca* 2 cm long, closely sheathing, situated well below spike. Flowers sessile, 3–25 in a fairly open spike, green with purple markings and purple hairs or wholly dark purplish, spreading, ovary curved, *ca* 3 mm long, smooth, subtending bracts ovate, *ca* 1.5 mm long, dorsal sepal striped, ovate, cucullate, deflexed, apex acute to acuminate, margin coarsely ciliate, *ca* 4–5 mm \times 2.5–3 mm, lateral sepals gibbous at base, erect to obliquely erect, divergent, apex bluntly acute, distal margin incurved, *ca* 6 mm \times *ca* 1.5 mm; petals striped, ovate, \pm falcate, spreading, acuminate, margin coarsely ciliate, *ca* 3.5 mm \times *ca* 1.5 mm; labellum articulate on column foot, linear-ovate, obliquely erect in a shallow sigmoidal curve, apex recurved, acuminate, margin \pm recurved with coarse, purple, spreading or tangled cilia up to 1.5 mm long, *ca* 4 mm \times *ca* 1.5 mm, callus hardly raised, oblong-tapered, \pm papillate, apex blunt, extending over *ca* $\frac{3}{4}$ lamina; column *ca* 2.2 mm long with foot *ca* 0.7 mm long, curved, wings broad, *ca* 1.7 mm long, bifid in distal half, anterior lobe acuminate, ciliate, posterior lobe linear, smooth; anther cap with a curved rostrum, *ca* 1.5 mm long; stigma ovate, *ca* 0.5 mm across.

Reported to occur in south-eastern Queensland but confirmatory specimens lacking. Flowers summer–autumn.

10. *Genoplesium pumilum* (J. D. Hook.) D. Jones & M. Clements

Prasophyllum pumilum J. D. Hook.; *P. viride* Fitzg.; *P. dixonii* F. Muell.; *P. aureoviride* Rupp; *P. aureoviride* var. *elmae* (Rupp) Rupp; *P. elmae* Rupp

Very slender plant up to 20 cm tall. Leaf blade subulate, *ca* 1 cm long, closely sheathing or spreading, ending close to spike. Flowers sessile, 3–20 in a fairly crowded spike, green to yellowish green, sometimes with a few red markings, deflexed, ovary curved, *ca* 2 mm long, subtending bracts ovate, *ca* 1 mm long; dorsal sepal ovate, cucullate, deflexed, apex acuminate, *ca* 2 mm \times *ca* 1.5 mm, lateral sepals \pm narrowly ovate, prominently gibbous at base, divergent, apex mucronate, sometimes gland-tipped, *ca* 2.5 mm \times *ca* 1.5 mm; petals ovate, projected forwards, apex obtuse or with a small white gland, *ca* 2 mm \times *ca* 1 mm; labellum articulate on column foot, obovate, spreading, apex acute to obtuse, recurved, margin in distal half irregular to denticulate, *ca* 2 mm \times *ca* 1.3 mm, callus bright green, very thick and fleshy, narrowly ovate, extending nearly to apex of lamina; column *ca* 1.5 mm long with foot *ca* 0.5 mm long, curved, wings broad, apex bifid in distal half, anterior lobe \pm longest, obtuse to acute, denticulate, posterior lobe deltoid, obtuse; anther cap rostrate, *ca* 1 mm long; stigma orbicular, \pm 0.5 mm across.

Recorded from the coastal districts in coastal heath and also open forest among grass, e.g. Burleigh Heads, Noosa, Cooloola, Boonooroo. Flowers autumn–winter.

11. *Genoplesium* sp. 3.

Slender plant up to 25 cm tall. Leaf blade *ca* 1.5 cm long, sheathing or spreading, ending close to spike. Flowers 5–25 in a crowded spike, light reddish brown, spreading to deflexed, ovary curved, *ca* 1.5 mm long, subtending bracts ovate, *ca* 0.7 mm long; dorsal sepal broadly ovate, cucullate, deflexed, apex acuminate, *ca* 2.5 mm \times *ca* 2 mm, lateral sepals \pm oblong, gibbous at base, divergent, apex acute, sometimes gland-tipped, distal margin incurved, *ca* 3 mm \times *ca* 1.3 mm; petals ovate, projected forwards, apex bluntly mucronate or with a curved white gland, *ca* 2 mm \times *ca* 1 mm; labellum articulate on column foot, pale red, ovate-obovate, spreading, flat or with recurved apex, apex acute, margin in distal half denticulate, *ca* 2.5 mm \times *ca* 1.5 mm, callus reddish black, very thick and fleshy, narrowly ovate, constricted near middle, channelled in basal half, ending just before apex of lamina; column *ca* 1.5 mm long with foot *ca* 0.5 mm long, curved, wings broad, bifid in distal half, anterior lobe longest, acuminate, curved, glabrous or shortly ciliate, posterior lobe obtuse; anther cap with a long curved rostrum, *ca* 1 mm long; stigma orbicular, \pm 0.5 mm across.

Recorded from Moreton district in coastal heathlands on sandy soil, e.g. Pine Ridge near Southport, Stradbroke I. Flowers autumn.

Previously misidentified as *G. nudiscapum* (J. D. Hook.) D. Jones & M. Clements (*Prasophyllum nudiscapum* J. D. Hook.) and *G. ruppii* (R. Rogers) D. Jones & M. Clements (*P. ruppii* R. Rogers).

12. *Genoplesium* sp. 4.

Very slender plant up to 15 cm tall. Leaf blade subulate, *ca* 1 cm long, closely sheathing to spreading, situated well below spike. Flowers sessile, 6–15 in a loose spike, spreading, ovary curved, *ca* 2 mm long, subtending bracts ovate, *ca* 0.5 mm long; sepals green, dorsal sepal ovate, cucullate, deflexed, apex obtuse to subacute, *ca* 3 mm \times *ca* 2 mm, lateral sepals linear-ovate, slightly gibbous at base, erect or recurved in distal half, divergent, apex subacute to obtuse, *ca* 3 mm \times *ca* 0.8 mm; petals red, narrowly ovate, spreading, apex acuminate to filiform, distal margin \pm crenulate, *ca* 2 mm \times *ca* 0.6 mm; labellum articulate on column foot, red, elliptic-oblong, recurved in distal third, apex filiform to caudate, margin irregularly crenulate, *ca* 2.5 mm \times *ca* 1 mm, callus thick, fleshy, linear-oblong, obtuse, extending nearly to apex of lamina; column *ca* 1.5 mm long with foot *ca* 0.5 mm long, curved, wings reddish, broad, bifid in distal third, anterior lobe longest, curved, acuminate, denticulate, posterior lobe short, obtuse; anther cap with long rostrum, *ca* 1 mm long; stigma orbicular, \pm 0.5 mm across.

Recorded from Toowoomba area, growing on shallow clay soil in open forest. Flowers autumn–winter.

13. *Genoplesium* sp. 5.

Very slender plant up to 20 cm tall. Leaf blade subulate, margin involute, *ca* 2 cm long, loosely sheathing, ending close to spike. Flowers sessile, 5–20 in a fairly crowded spike, uniformly dark purple, spreading to deflexed, ovary \pm curved; *ca* 2 mm long, subtending bracts ovate, *ca* 0.5 mm long; dorsal sepal ovate, cucullate, deflexed, apex subacute, *ca* 2.5 mm \times *ca* 2 mm, lateral sepals linear-ovate, gibbous at base, not recurved in distal half, divergent, apex obtuse, distal margin incurved, *ca* 2.5 mm \times *ca* 1 mm; petals obliquely ovate, apex acuminate, margin irregularly dentate, *ca* 2 mm \times *ca* 1 mm; labellum articulate on column foot, reddish black, obovate, apex obtuse, recurved, margin irregularly lacinate, *ca* 2 mm \times *ca* 1.5 mm, callus thick, fleshy, \pm dumbbell-shaped, narrowed near middle, \pm papillate, extending to apex of lamina; column *ca* 1.5 mm long with foot *ca* 0.3 mm long, curved, wings broad, bifid in distal half, anterior lobe longest, curved, acuminate, denticulate, posterior lobe linear, obtuse, smooth; anther cap with curved rostrum, *ca* 1 mm long; stigma orbicular, *ca* 0.5 mm across.

Recorded from the Noosa area on white sandy soil under coastal scrub. Flowers autumn–winter.

14. *Genoplesium* sp. 6.

Very slender plant up to 25 cm tall. Leaf blade subulate, *ca* 1 cm long, closely sheathing, situated well below spike. Flowers sessile, 10–25 in an uncrowded, drawn-out spike, light reddish brown, spreading, ovary curved, *ca* 2 mm long, subtending bracts ovate, *ca*

0.5 mm long; dorsal sepal ovate, cucullate, deflexed, apex long acuminate to caudate, *ca* 3 mm \times *ca* 2 mm, lateral sepals linear-ovate, gibbous at base, erect in distal half, divergent, apex acute, distal margin incurved, *ca* 4 mm \times *ca* 0.6 mm; petals with a central dark stripe and dark margin, ovate, apex acuminate, *ca* 2 mm \times *ca* 1 mm; labellum articulate on column foot, dark red with some green on callus, \pm obovate, apex subacute, recurved, distal margin undulate to irregularly denticulate, *ca* 2.5 mm \times *ca* 1.5 mm, callus thick, fleshy, narrowly cordate, constricted below apex, channelled at base, ending *ca* 1 mm from apex of lamina; column *ca* 1.5 mm long with foot *ca* 1 mm long, curved, wings broad, bifid in distal two-thirds, anterior lobe shortest, acute, denticulate, posterior lobe linear, obtuse; anther cap shortly rostrate, *ca* 1 mm long; stigma orbicular, \pm 0.5 cm across.

Recorded from Girraween National Park in the Darling Downs district, on shallow soil over granite. Flowers late summer–autumn.

15. *Genoplesium rufum* (R. Br.) D. Jones & M. Clements sens. lat.

Prasophyllum rufum R. Br.

Very slender plant up to 25 cm tall. Leaf blade subulate, margin involute, *ca* 1.5 cm long, loosely sheathing, situated well below spike. Flowers sessile, 10–30 in a fairly crowded spike, uniformly dark purple, spreading to deflexed, ovary \pm curved, *ca* 2 mm long, subtending bracts ovate, *ca* 0.5 mm long; dorsal sepal ovate, cucullate, deflexed, apex acuminate, sometimes gland-tipped, *ca* 2.5 mm \times *ca* 1.5 mm, lateral sepals linear-ovate, gibbous at base, erect or decurved in distal half, divergent, apex gland-tipped, distal margin incurved, *ca* 3.5–4 mm \times *ca* 1 mm; petals with a central dark stripe, ovate, apex acuminate, *ca* 2 mm \times *ca* 0.6 mm; labellum articulate on column foot, reddish black, \pm obovate, apex acuminate to mucronate, recurved, distal margin irregularly crenulate to denticulate, *ca* 2 mm \times *ca* 1 mm, callus black, thick, fleshy, narrowly cordate, \pm papillate, slightly constricted near middle, channelled at base, extending nearly to apex of lamina; column *ca* 2 mm long with foot *ca* 0.3 mm long, curved, wings broad, bifid in distal half, anterior lobe longest, curved, acuminate, denticulate to shortly ciliate, posterior lobe obtuse, smooth; anther cap shortly rostrate, *ca* 1 mm long; stigma orbicular, \pm 0.3 mm across.

Recorded from southern Moreton district, in coastal areas on sandy soil, e.g. Burleigh Heads, Stradbroke I. Flowers autumn–winter.

G. rufum is part of a widespread variable complex which is in need of study. The previous four taxa are part of this complex.

23. CRYPTOSTYLIS R. Br.

Terrestrial herbs with inflorescence and leaves arising directly and separately from very small rhizome, roots present. Leaves \pm erect, few or absent. Inflorescences erect racemes, peduncles moderately long; flowers reversed, dominated by labellum; sepals longer than petals; labellum basally connate housing column, disc generally with keels and/or calli; column extremely small, short, winged; anther large, sessile, behind or incumbent on column, 2-locular, usually tilting upwards as pollinia mature, pollinia powdery or granular, 4 in 2 unattached lamellate pairs, members of a pair unequal, narrowly pyriform and usually deeply channelled, all attached directly to single \pm hemispherical viscidium; stigma very prominent at base of column, rostellum situated in centre of anterior part of stigma, fleshy, round.

20 species, Taiwan, Indomalaysia, Australia, Pacific Is; 5 species Australia; 3 species south-eastern Queensland.

- | | | |
|--|-------------------------|---|
| 1. Labellum very concave, forming a hood over rest of flower | 1. <i>C. erecta</i> | |
| Labellum not concave, not forming a hood over rest of flower | | 2 |
| 2. Labellum straight, with a large dark humped boss near apex | 2. <i>C. subulata</i> | |
| Labellum strongly recurved, contracting suddenly in basal third, with two rows of 6–9 dark shiny calli | 3. <i>C. leptochila</i> | |

1. *Cryptostylis erecta* R. Br.**BONNET ORCHID**

Usually slender herb up to 80 cm tall. Leaves 1–3; petioles 1.5–25 cm long; blades narrowly elliptic, rarely narrowly ovate or obovate, apex acute, base tapering, 3–17 cm × 1.2–3.5 cm, green on upper surface, reddish purple beneath. Scape with 2 or 3 sheathing acuminate bracts 1–3 cm long; flowers sessile, 2–12, green with purplish and red-brown stripes and other markings, ovary 1–1.5 cm long; sepals linear, acute, 2–2.5 cm × ca 0.2 cm; petals very narrowly ovate, acute, ca 1.5 cm × ca 0.2 cm; labellum cucullate, with marked posterior constriction towards base, very broadly ovate, ± obtuse, base horizontal, enclosing column, 2.5–3.5 cm long, membranous part with a network of conspicuous purplish reticulate veins arising from purplish base, callus plate green, extending $\frac{2}{3}$ length of labellum down middle; column short, broad, produced into 2 wide wings with denticulate-glandular margin. Capsules narrowly obovate, ca 2–2.5 cm long. **Fig. 57E.**

Coastal districts, in wallum and moist or swampy areas, also Girraween National Park in the Darling Downs district. Flowers spring to autumn.

2. *Cryptostylis subulata* (Labill.) H. G. Reichb.**LARGE TONGUE ORCHID;
COW ORCHID**

Malaxis subulata Labill.; *Cryptostylis longifolia* R. Br.

Slender herb up to 90 cm tall. Leaves 1–4; petioles 2.5–16.5 cm long; blades narrowly elliptic or narrowly oblong-elliptic, base cuneate to attenuate, 7–18 cm × 1.2–3 cm, green on both surfaces. Scape with few distant sheathing acuminate bracts 1–3.5 cm long; flowers 2–15, yellowish or greenish with red-brown or sometimes greenish brown labellum, pedicels including ovary ca 1.8 cm long; sepals linear-subulate, 1.5–3 cm × 0.2–0.3 cm; petals linear, 1–2 cm × 0.1–0.15 cm; labellum ± oblong, acute, margins at centre rolled back and usually overlap or meet, labellum appearing constricted at that point, 2–3.5 cm × 0.6–0.9 cm, disc with 2 thick glandular keels and 1 or 2 finer ones extending from near base for $\frac{3}{4}$ length of labellum, terminating in prominent dark coloured bilobed callus near apex; column ca 3 mm long, wings broad and extending slightly higher than anther, with crenulate and incised margin. Capsules obovoid or ellipsoid, 1.5–2 cm long.

Along or near the coast, also Girraween National Park in the Darling Downs district, in swampy areas. Flowers late winter through summer.

3. *Cryptostylis leptochila* F. Muell. ex Benth.**SMALL TONGUE ORCHID**

Cryptostylis leptochila var. *frenchiana* F. Muell.

Slender herb up to 35 cm tall. Leaves 1–4; petioles 3–6 cm long; blades broadly ovate, apex acute, base cordate, 5–9 cm × 3–4 cm, dark green on upper surface, reddish purple beneath. Scape with 2 or 3 sheathing narrowly ovate bracts 2–3 cm long; flowers 5–12, greenish with a dark red labellum, sessile on ovary 1.5–1.8 cm long; sepals linear, acute, 1.8–2 cm × 0.2–0.3 cm; petals linear, 1.3–1.5 cm × 0.1–0.15 cm; labellum oblong-linear, abruptly contracted in basal third, recurved in distal two-thirds, apex acute, margin recurved, 2.8–3.2 cm × 0.5–0.6 cm, surface densely covered with glandular hairs, callus plate central, thick, dark, shiny, usually interrupted to form a series of short calli, flanked on either side by up to 9 dark shiny domed calli; column ca 2.5 mm long, wings denticulate, erect behind anther. Capsules obovoid, 1.5–1.8 cm long.

Mountainous areas of the Moreton district and Girraween National Park in the Darling Downs district, in eucalypt open forests. Flowers summer.

24. THELYMITRA J. R. & G. Forster

Deciduous terrestrial herbs with ovoid or obovoid tuberoids. Leaf solitary, arising from ground level, attached to flower stem in flowering plants, sheathing at base, elongated, often fluted. Inflorescences terminal, often showy; flowers 1–many; sepals and petals all ± similar, not clawed; labellum scarcely differentiated; column erect, of medium height, widely winged, wings united shortly in front at base, either produced and connected behind anther to terminate in margin, or produced forward over anther to form often

bilobed hood, with appendages 1 on either side of anther, anther erect behind stigma or incumbent and projected over stigma, pollinia 2, mealy, each very deeply grooved, appearing like 2 pairs, attached to well developed viscidium; stigma on erect plate-like style, cleft.

45 species, Malaysia, Australia, New Zealand; 39 species Australia; 8 species south-eastern Queensland.

- | | |
|---|-------------------------|
| 1. Lateral lobes of column terminating in hair tufts | 2 |
| Lateral lobes of column not terminating in hair tufts | 6 |
| 2. Column wings not forming a hood over anther | 1. <i>T. media</i> |
| Column wings forming a hood over anther | 3 |
| 3. Hood between lateral lobes irregularly crested | 2. <i>T. ixioides</i> |
| Hood between lateral lobes not crested nor dentate | 4 |
| 4. Flowers usually lavender to pink; hair tufts on column wing appendages toothbrush-like | 3. <i>T. nuda</i> |
| Flowers with various colours; hair tufts on column wing appendages paintbrush-like | 5 |
| 5. Leaves narrow, erect; flowers not scented, self-pollinating | 4. <i>T. pauciflora</i> |
| Leaves broad, flaccid; flowers strongly fragrant, not self-pollinating | 5. <i>T. fragrans</i> |
| 6. Sepals <i>ca</i> 1.3–1.6 cm long, almost always blue with darker blue veins running through them | 6. <i>T. cyanea</i> |
| Sepals <i>ca</i> 0.5–0.8 cm long, never blue | 7 |
| 7. Lateral lobes of column slightly crenate, more than twice as long as wide | 7. <i>T. carnea</i> |
| Lateral lobes of column rugulose-denticulate, less than twice as long as wide | 8. <i>T. rubra</i> |

1. *Thelymitra media* R. Br.

TALL SUN ORCHID

Thelymitra media var. *carneo-lutea* Nicholls

Slender to robust herb up to *ca* 80 cm tall. Leaf coriaceous, linear-ovate, erect, 12–25 cm long, ribbed. Scape with 1–3 closely sheathing narrowly ovate bracts up to 9 cm long; flowers few-several, often crowded, pale blue to deep blue, rarely pink or white, expanding freely in hot weather, pedicels including ovary 1.8–2.2 cm long; sepals and petals elliptic to narrowly ovate, sepals much narrower than petals, 1.2–1.5 cm long; column cream to mauve with a yellow 3-lobed apex, subtended by a dark collar-like band, *ca* 5 mm long, not forming hood, with several irregular rows of erect calli, lateral lobes horizontal, with a terminal brush-like tuft of hairs; anther narrow, just shorter than midlobe. Capsules ovoid, 1.5–2 cm long.

Stanthorpe area in the Darling Downs district, in eucalypt forest. Flowers spring.

2. *Thelymitra ixioides* Swartz

DOTTED SUN ORCHID

Thelymitra iridioides Sieber ex Benth.; *T. purpurata* Rupp; *T. ixioides* var. *carnea* Guilfoyle nom. inval.

Slender to moderately robust herb up to *ca* 60 cm tall. Leaf linear, acute, channelled, 10–40 cm long, glabrous. Scape with sheathing bracts up to 5 cm long; flowers few-several, colour variable, usually blue, mauve or violet but sometimes pink or white, often with dark spots on upper segments, pedicels including ovary 1–1.5 cm long; sepals and petals all \pm similar, elliptic to elliptic-obovate, mucronate, 1.2–2(–2.5) cm long; column *ca* 5–8 mm long, lateral lobes obliquely erect, ending in a dense tuft of hairs, wings forming a hood only just covering anther, margin yellow, 3-lobed with finger glands forming a double crest on outside of hood at base of lobes; anther with apical projection curving forward on same level as pectinate lobes. Capsules obovoid, or narrowly obovoid, 1.2–1.6 cm long. **Fig. 57F.**

Mainly along the coast, in swampy or poorly drained areas, in wallum heath or understorey in eucalypt forest, but also in the Stanthorpe-Wallangarra area of the Darling Downs district. Flowers late winter–spring.

3. *Thelymitra nuda* R. Br.**SCENTED SUN ORCHID**

Thelymitra graminea Lindl.; *T. nuda* var. *grandiflora* Lindl.; *T. angustifolia* auct. non R. Br., J. D. Hook.; *T. megcalyptra* Fitzg.; *T. aristata* Lindl. var. *megcalyptra* (Fitzg.) Nicholls; *T. grandis* Benth. nomen nudum

Usually slender herb 25–60 cm tall. Leaf usually thick, linear to linear-ovate, flat or widely channelled, acute, 10–25 cm long. Scape with 2 or 3 loosely sheathing bracts up to ca 5 cm long; flowers 1–10, pale mauve, lavender, pink or white, opening freely, not self-pollinating, pedicels including ovary ca 0.8–1.2 cm long; sepals and petals oblong-elliptic, acute, 0.8–1.7 cm long, petals sometimes broader than sepals; column \pm erect, 5–8 mm long, forming a hood, hood dilated laterally, cleft in front to varying depths, cleft slender or broad, hood margin decurved, lateral lobes projected forward with hair tufts erect, \pm at right angles to lobe, somewhat toothbrush-like, but often not very obvious. Capsules obovoid or narrowly obovoid.

Coastal districts, near the coast in grassland, e.g. Torbanlea, Burleigh Heads; apparently uncommon. Flowers late winter–spring.

4. *Thelymitra pauciflora* R. Br.**SLENDER SUN ORCHID**

Thelymitra colensoi J. D. Hook.; *T. cornuta* Colenso; *T. sanscilia* Irwin ex Hatch; *T. pauciflora* var. *pallida* Nicholls nom. inval.

Usually slender herb 10–50 cm tall. Leaf often thick and fleshy, linear to linear-oblong, channelled, acute, very variable in length and width. Flowers 1–15, usually pale or dark blue, but also white, mauve or pink, opening only in warm fine weather, self-pollinating, pedicels slender, ca 0.8–1.2 cm long; sepals and petals ovate, contracted towards apex, apex \pm acute, ca 6–10 mm long; column erect, ca 5 mm long, forming a hood, hood variable in length and colour, occasionally dilated apically, cleft to varying degree of depth and thickness, divisions rounded and entire, lateral lobes bent upwards and terminated by paintbrush-like tufts of hairs. Capsules \pm obovoid.

Mainly coastal districts. Flowers late winter–spring, sometimes into summer.

The preceding two species can be very difficult to distinguish between and a critical study is needed to clarify the differences.

5. *Thelymitra fragrans* D. Jones & M. Clements

Slender herb 15–45 cm tall. Leaf narrowly ovate to strap-shaped, flat to shallowly channelled, usually flaccid, 15–30 cm \times 2–4 cm. Scape with 2 or 3 loosely sheathing bracts up to 4 cm long; flowers 1–12, blue to mauve or pinkish tinged, opening freely, not self-pollinating, strongly fragrant, pedicels including ovary ca 1–1.3 cm long; sepals and petals oblong-elliptic, acute to acuminate, 1.3–1.5 cm long, petals broader than sepals; labellum narrowly obovate; column \pm erect, 5.5–7 mm long, forming a hood, hood cinnamon-brown with a yellowish apex, dilated laterally, cleft in front about halfway, cleft fairly broad, hood margin decurved, lateral lobes projected forward with white hair tufts erect, \pm at right angles to lobe, brush-like. Capsules obovoid.

Rocky escarpments of the McPherson Ra., often growing in clumps of *Dendrobium kingianum*; common. Flowers spring.

6. *Thelymitra cyanea* (Lindl.) Benth.**VEINED SUN ORCHID**

Thelymitra venosa R. Br. var. *speciosa* Nicholls nom. inval.

Slender plant usually 15–75 cm tall. Leaf linear, channelled, often extending beyond middle of scape. Scapes \pm sinuous; flowers 1–3, rarely –6, blue, rarely white or pink, pedicels including ovary ca 2–2.5 cm long; sepals and petals with conspicuous darker blue veins, 1.3–1.6 cm long, sepals longer than petals; labellum broadly ovate, anterior margin crisped; column erect, 5–6 mm long, widely winged, not hooded, wings produced laterally into 2 blunt erect spirally involute yellow appendages on each side of and above anther; anther very protuberant, overhanging stigma, apex prolonged and bifid, ca as high as lateral lobes.

Common in alpine moss beds and swamps in southern states, may possibly be found in high altitude swampy parts of southernmost districts, e.g. Dave's Ck Country on McPherson Ra. or Girraween National Park near Wallangarra. Flowers spring–summer.



Fig. 57 ORCHIDACEAE — **A** *Prasophyllum patens*, flower x 3; **B–C** *Genoplesium* spp. — **B** *G. acuminatum*, flower showing ciliate margins on perianth lobes x 3; **C1–C2** *G. trifidum*, **C1** inflorescence x 3, **C2** flower showing gland on tip of petal x 6; **D** *Microtis unifolia*, part inflorescence x 3; **E** *Cryptostylis erecta*, flower x 1½; **F1–F2** *Thelymitra ixioides*, **F1** part inflorescence x ½, **F2** column showing crested hood and tufts of hairs on lateral lobes x 4.

7. *Thelymitra carnea* R. Br.

PINK SUN ORCHID

Thelymitra imberbis J. D. Hook.; *T. carnea* var. *imberbis* (J. D. Hook.) Rupp & Hatch
Very slender wiry herb 12–35 cm tall; stems often markedly flexuose. Leaf linear-terete, erect, slightly channelled, acute, usually 10–15 cm long. Scape with 2 or 3 sheathing, acuminate bracts up to ca 2.5 cm long; flowers usually 1–4, bright pink, salmon pink or creamy white, expanding briefly only during hot humid weather, pedicels including ovary 1–1.5 cm long; sepals and petals elliptic, mucronate, 5–7 mm long; column pinkish or pale greenish with yellow apex, ca 4 mm long, apex 3-lobed, midlobe ± similar in length to anther, not forming hood, lateral lobes without hair tufts, ± denticulate; anther prominent, only base concealed behind stigma, very broad and obtuse. Capsules obovoid, 1.2–1.5 cm long.

Recorded from Boonooroo area near Maryborough and Lamington and Girraween National Parks in southern parts of the region. Flowers spring.

8. *Thelymitra rubra* Fitzg.

SALMON SUN ORCHID

Thelymitra urnalis Fitzg.; *T. carnea* R. Br. var. *rubra* (Fitzg.) J. Weber & R. Bates
Slender, wiry herb 15–45 cm tall; stems dark purplish red, often markedly flexuose. Leaf linear-ovate or terete, erect, slightly channelled, usually 12–20 cm long. Scape with 2 or 3 closely sheathing bracts up to 7 cm long; flowers usually 1–4, bright pink, reddish pink or creamy yellow, expanding only in hot weather, pedicels including ovary 1.5–2 cm long; sepals and petals elliptic, obtuse, 6–8 mm long; column pink, yellow or orange with orange-yellow apex, ca 5 mm long, apex 3-lobed, midlobe similar in length to anther, not forming hood, lateral lobes without hair tufts, strongly denticulate, rugulose; anther prominent, only base concealed behind stigma, very broad and obtuse. Capsules obovoid, 1.5–2 cm long.

Recorded from Girraween National Park in the Darling Downs district. Flowers spring.

25. *CORYBAS* Salisb.

Dwarf deciduous terrestrial herbs arising from small round tuberoids. Leaf solitary, ± cordate, reniform or circular, usually at ground level. Peduncle very short, terminal on leaf stalk; flowers solitary on short pedicel; dorsal sepal large, cucullate, lateral sepals and petals very small or rudimentary (in Australian species); labellum quite large, deeply concave or tubular in basal section, completely enveloping column and usually with 2 auricles, 1 either side at base, labellum expanded past orifice; column small, erect, without lateral wings but sometimes with small wings at apex, often with staminode in front at base; anther terminal, erect, 2-locular, large, extending much higher than column, pollinia granular or mealy, 4 in 2 pairs, all attached to single viscidium without caudicles or stipes; stigma prominent at front apex of column, rostellum on top of stigma, not prominent. Peduncle usually elongating after fertilisation.

50 species, Indomalaysia, Solomon Is, Australia, New Zealand; 12 species Australia; 7 species south-eastern Queensland.

- | | |
|--|----------------------------|
| 1. Margin of labellum fimbriate or serrulate | 2 |
| Margin of labellum entire | 6 |
| 2. Margin of labellum minutely and irregularly serrulate; labellum tube 2-spurred | 3 |
| Margin of labellum fimbriate; labellum tube not 2-spurred | 5 |
| 3. Labellum apex ± caudate; pedicels including ovary 3–4 mm long in flower; diminutive plant up to ca 2 cm tall | 1. <i>C. undulatus</i> |
| Labellum apex not caudate; pedicels including ovary 4–10 mm long in flower; dwarf plants 2–4 cm tall | 4 |
| 4. Flowers dull reddish purple; dorsal sepal narrowly elliptic, ca 1 cm wide when flattened; labellum auricles projected downwards parallel to ovary | 2. <i>C. aconitiflorus</i> |

- | | |
|---|----------------------------|
| Flowers frosty white; dorsal sepal broadly elliptic, <i>ca</i> 2 cm wide when flattened; labellum auricles projecting obliquely forwards from ovary | 3. <i>C. barbarae</i> |
| 5. Dorsal sepal as broad as but shorter than labellum, not extended out beyond it; labellum smooth or shortly scabrid, central mounded boss entire | 4. <i>C. fimbriatus</i> |
| Dorsal sepal long, much narrower than labellum and extending out beyond it; labellum conspicuously hispid, central mounded boss notched | 5. <i>C. hispidus</i> |
| 6. Labellum auricles closed | 7 |
| Labellum auricles with an open orifice | 8 |
| 7. Labellum longer than dorsal sepal; flowers not striped | 6. <i>C. montanus</i> |
| Labellum shorter than dorsal sepal; flowers striped | 7. <i>C. fordhamii</i> |
| 8. Flowers dull reddish purple; dorsal sepal narrowly elliptic, <i>ca</i> 1 cm wide when flattened; labellum auricles projected downwards parallel to ovary | 2. <i>C. aconitiflorus</i> |
| Flowers frosty white; dorsal sepal broadly elliptic, <i>ca</i> 2 cm wide when flattened; labellum auricles projected obliquely forwards from ovary | 3. <i>C. barbarae</i> |

1. *Corybas undulatus* (R. Cunn.) Rupp & Nicholls ex Rupp

TAILED HELMET ORCHID

Corysanthes undulata R. Cunn.

Diminutive plant up to *ca* 2 cm tall. Leaf broadly ovate, apex shortly abruptly acuminate, base cordate, 1–2.6 cm × 0.8–2.4 cm, upper surface green with prominent midrib, lower surface paler, often purple tinged. Flowers sessile on ovary 3–4 mm long, subtended by linear bract 3.5–5.5 mm long; flowers dark purplish red with prominent veins; dorsal sepal erect, cucullate, deeply concave, apex blunt or minutely apiculate, 0.6–1.5 cm long, lateral sepals linear, erect from between spurs, 1.5–3.5 mm long; petals abortive or *ca* 1 mm long; labellum large, tubular in basal half with prominent rounded protuberance on anterior margin immediately below expanded part, tube longitudinally divided at rear, 2 small spurs at base *ca* 1–1.5 mm long, enclosing column, expanded part whitish or suffused with purple, ± circular, apex mucronate, margin irregularly serrate-dentate, 6–10 mm long, entire surface glandular verrucose, with prominent raised central boss, apex shortly caudate; column 2.5–3 mm high, wings prominent, acute.

Sandy wallum areas of the coastal districts or under eucalypt forest in heathy understorey, e.g. Tugan, Cooloolo, Coolum. Flowers winter–spring.

2. *Corybas aconitiflorus* Salisb.

SPURRED HELMET ORCHID

Corysanthes bicalcarata R. Br.

Dwarf plant 2–4 cm tall. Leaf membranous, broadly ovate, apex abruptly acuminate, base deeply cordate, 1.4–2 cm × 1.4–2 cm, grey-green above, usually reddish or purplish below, reticulately veined. Pedicels including ovary 4–10 mm long, subtending bract acuminate, 2–4 mm long, flowers dull reddish purple; dorsal sepal bent over enclosing labellum, very convex, apex acute, often upturned, not markedly contracted at base, 2–2.4 cm × 0.8–1 cm when flattened, lateral sepals and petals linear-subulate, not readily discernible from outside flower, sepals *ca* 2–2.5 mm long, petals *ca* 1 mm long; labellum usually *ca* half length of dorsal sepal, ± upright, tubular part much longer than expanded part and very narrow towards base, extended below into 2 conspicuous horn-like spurs 3–4 mm long which project down along ovary, expanded part whitish often marked with red or purple, convex, often undulate and sparsely ciliate with cilia up to 0.1 mm long, margin entire, recurved, but due to cilia sometimes appearing serrulate; column *ca* 3–4 mm long, very narrowly winged with prominent gibbosity in front at base. Capsules on elongated peduncle 2.5–12 cm long, ellipsoid, 1–1.5 cm long. **Fig. 58A.**

Southern parts of Moreton district in moist sheltered areas in open forest, e.g. Lamington National Park, Burleigh Heads, Stradbroke I.; rare. Flowers autumn–winter.

3. *Corybas barbarae* D. Jones

Dwarf plant 2–4 cm tall. Leaf membranous, broadly ovate to cordate, apex abruptly acuminate, 1.4–3.5 cm \times 1.4–3.6 cm, grey-green above with lighter veins, usually reddish or purplish below. Pedicels including ovary 6–10 mm long, subtending bract acuminate, 4–6 mm long; flowers frosty white, sometimes with a slight pink flush towards apex; dorsal sepal bent over enclosing labellum, very convex, apex acute, often upturned, not markedly contracted at base, 2.8–3.2 cm \times 1.7–2 cm when flattened, lateral sepals and petals linear-subulate, not readily discernible from outside flower, sepals 2 mm long, petals *ca* 1 mm long; labellum usually *ca* half length of dorsal sepal, \pm upright, tubular part much longer than expanded part and very narrow towards base, extended below into 2 conspicuous horn-like spurs 4–6 mm long which project forwards from ovary, expanded part whitish with a few red spots, convex, often undulate, densely ciliate over whole surface with cilia up to *ca* 0.5 mm long, margin entire, recurved but due to cilia sometimes appearing serrulate; column 4–5 mm long, very narrowly winged with prominent gibbosity in front at base. Capsules on elongated peduncle, ellipsoid, 1.5–2 cm long.

Widespread in Moreton and Wide Bay districts in moist, sheltered areas. Flowers autumn–winter.

4. *Corybas fimbriatus* (R. Br.) H. G. Reichb.**FRINGED HELMET ORCHID**

Corysanthes fimbriatus R. Br.

Small herb up to *ca* 2.5 cm tall. Leaf broadly ovate to orbicular, apex mucronate, base cordate, 1.4–3.4 cm \times 1.5–3.6 cm, green both sides. Flowers \pm sessile on ovary 3–4 mm long, subtending bract acute, 1.5–2 mm long; flowers purplish red or crimson; dorsal sepal transparent with numerous purplish red spots, broadly cuneate, cucullate over labellum, much contracted in lower half, 1.2–2.2 cm long, lateral sepals usually connate, linear, 5–6 mm long; petals linear, 3–5 mm long; labellum 1.2–1.9 cm long, tube split and enclosing column, erect against dorsal sepal, usually with 2 very prominent auricles at base, widely expanded part *ca* 1.2–1.7 cm long, reflexed, longer than tube, margin deeply fimbriate, often inflexed, surface reticulate and minutely glandular, boss mainly purplish red; column *ca* 3 mm long, not winged.

Coastal districts, in moister areas in open forest, e.g. Mt Tamborine, Springbrook. Flowers autumn–winter.

5. *Corybas hispidus* D. Jones**BRISTLY HELMET ORCHID**

Small herb up to *ca* 3 cm tall. Leaf broadly ovate to orbicular, apex mucronate, base cordate, 1.5–3.5 cm \times 1.5–3.8 cm, green both sides. Flowers \pm sessile on ovary 5–6 mm long, subtended by acute bract *ca* 1–2 mm long; flowers reddish purple; dorsal sepal greenish grey dotted with dark purple, cucullate, concave, broadly spatulate, obtuse, very contracted in lower third, 2–2.5 cm long, lateral sepals linear-triangular, deflexed, apex \pm bifid, *ca* 6 mm long; petals slightly falcate, forming broad wings at base where they join column then tapering to filiform points, *ca* 6 mm long; labellum tube 5–7 mm long with small basal auricles, erect for *ca* 5 mm then abruptly decurved and greatly expanded, expanded part reddish purple with conspicuous white central boss, broadly ovate or deltoid, margin with fimbriae up to 5 mm long, whole 1.6–2.2 cm long, boss dome-like, conspicuously hispid, notched in upper third, minute teeth especially obvious on margin of notch; column *ca* 3 mm long, prominently winged.

Great Dividing Ra., in rocky areas, e.g. Mt Cordeaux, Crows Nest area. Flowers autumn.

6. *Corybas montanus* D. Jones**SMALL HELMET ORCHID**

Small herb up to *ca* 3 cm tall. Leaf ovate to broadly ovate, sometimes tending to be 3-lobed, apex abruptly acuminate, base cordate, 1.3–3.2 cm \times 1–3 cm, grey-green above, often purplish grey below, strongly ribbed. Pedicels including ovary 0.8–2 cm long, subtending bract 4–7.5 mm long; flowers almost entirely deep reddish purple with a sheen; dorsal sepal abruptly narrowed into claw *ca* as long as expanded part, with a \pm whitish border, expanded part deeply concave, 0.8–1.2 cm long, lateral sepals filiform-subulate, 4–5 mm long, spreading below labellum; petals linear, 4–6 mm long, spreading beside labellum; labellum tubular, inflated about middle, greatly narrowed towards lamina and orifice, lateral margins meeting along back on midline, orifice oblique, margin

and inner surface with minute cilia, with inturned glistening dark red calli along centre of labellum from orifice almost to base; column *ca* 4 mm long, incurved, 2-winged.

Recorded from Mt Maroon in the Moreton district, also Mt Norman, Stanthorpe and Wallangarra areas in the Darling Downs district. Flowers winter.

Previously confused with *C. unguiculatus* (R. Br.) H. G. Reichb.

7. *Corybas fordhamii* (Rupp) Rupp
Corysanthes fordhamii Rupp

Small herb usually 2–4 cm tall. Leaf usually above ground level, broadly ovate, apex acute, base cordate, 0.9–2.8 cm × 0.6–2 cm, green both sides. Pedicels including ovary 1–2.5 cm long, subtending bract 2.5–5 mm long; dorsal sepal reddish purple from near base, apex pallid, narrowly cuneate, not abruptly contracted into claw, narrow posterior part gradually recurved, expanded part ovate-oblong, convex above, apex emarginate, 0.8–1.4 cm long, lateral sepals linear, 6–8 mm long; petals linear, 5–6 mm long, both appressed to sides of labellum; labellum conspicuously striped with dark reddish purple except for dark purple basal third and transparent auricle close to base, tubular but not very narrow until very close to base, contracting to a rather small orifice in front, lower lip of orifice striate with large reddish purple blotch immediately behind broadly emarginate apex, irregular inwardly directed fimbriae present at base of blotch but no rows of calli; column slender, *ca* 3 mm long, much incurved close to summit, wings obscure.

Recorded from coastal wallum or swampy areas in the Moreton district now largely under housing development, e.g. Burleigh and Tugun areas. Flowers late winter.

26. PTEROSTYLIS R. Br.

Terrestrial herbs, usually glabrous, with ovoid to globose tuberoids. Leaves several, in a rosette or cauline, rosette radical, encircling base of scape or one or more on accessory basal growths or absent and rosulate only on non-flowering plants. Flowers 1–several, reversed; dorsal sepal strongly concave, cucullate, curved, its lateral margins closely embracing petals to form a galea over column, lateral sepals connate for part or nearly all their length, whole structure held erect in front of galea or reflexed against ovary; petals falcate, often flared near apex, upper surface with central longitudinal groove; labellum attached to an irritable basal claw projecting from column foot, partially or wholly protruding from galea when in the set position, lamina undivided or obscurely 3-lobed, glabrous, hairy, ciliate or with swollen shiny siliceous cells, base rounded or produced into a curved strap which is lobed or penicillate at its apex, disc not prominent; column elongated, its base produced into a curved or horizontal foot, prominently winged near apex, wings forming a tunnel above stigma; anther 2-locular, pollinia 2 per loculus, linear to clavate or crescentic, inclined over rostellum, caudicle absent; viscidium absent; rostellum connected to stigma by prominent groove; stigma flat.

About 100 species, mainly Australian, also New Zealand, New Guinea and New Caledonia; *ca* 65 species Australia; 32 species south-eastern Queensland.

Measurements of flowers in this genus are taken in a straight line from the base of the flower to either the top of the curve in the galea or the tip, whichever is longest.

1. Lateral sepals erect, free points embracing galea	.	.	.	.	.	.	.	.	.	2
Lateral sepals deflexed, free points not embracing galea	.	.	.	.	.	.	.	.	.	22
2. Flowers 0.6–1.2 cm long; free points of lateral sepals 2–2.5 mm long	.	.	.	.	.	.	.	.	.	3
Flowers more than 1.5 cm long; free points of lateral sepals more than 8 mm long	.	.	.	.	.	.	.	.	.	6
3. Apex of petals produced into a tail 4–5 mm long which far exceeds dorsal sepal	.	.	.	.	.	.	.	.	.	4
Apex of petals acute or obtuse, shorter than or as long as dorsal sepal	.	.	.	.	.	.	.	.	.	4

1. *P. bicornis*

- | | | |
|--|---|----------|
| 4. Flowers dark chocolate brown; labellum rhombic to broadly elliptic
Flowers green or green and white with some brown at apex of galea;
labellum oblong to very narrowly ovate | 2. <i>P. nigricans</i> | 5 |
| 5. Lateral sepals exceeding galea; labellum <i>ca</i> 4 mm long
Lateral sepals not reaching top of galea; labellum <i>ca</i> 2.5 mm long | 3. <i>P. sp. 1.</i>
4. <i>P. parviflora</i> | |
| 6. Flowering plants with stem-encircling basal rosette or stem leaves more
than 10 mm wide
Flowering plants lacking stem-encircling basal rosette, rosette
appearing separately on non-flowering plants, stem leaves <i>ca</i> 5 mm
wide or less | | 7
16 |
| 7. Segments of galea cohering loosely; leaves forming very loose rosette,
often scattered up flowering scape
Segments of galea tightly adherent; leaves in distinct stem-encircling
basal rosette | 5. <i>P. furcata</i> | 8 |
| 8. Apex of labellum deeply notched
Apex of labellum entire | 6. <i>P. ophioglossa</i> | 9 |
| 9. Flowers 4–6 cm long
Flowers less than 3.5 cm long | 7. <i>P. baptistii</i> | 10 |
| 10. Flowers semi-nodding to strongly nodding; labellum hispid
Flowers erect to semi-nodding; labellum never hispid | 8. <i>P. nutans</i> | 11 |
| 11. Labellum tapering to acuminate point
Labellum obtuse | 9. <i>P. acuminata</i> | 12 |
| 12. Dorsal sepal ending in filiform point 1.5–2.5 cm long
Dorsal sepal obtuse to acute or acuminate, never filiform | 10. <i>P. pedoglossa</i> | 13 |
| 13. Labellum more than 9 mm long; flowers green and white with some
brown suffusions
Labellum 4.5–7 mm long; flowers heavily suffused with brown | | 14
15 |
| 14. Flowers 2.5–3.5 cm long; labellum tip twisted to one side
Flowers 2–2.5 cm long; labellum tip not twisted to one side | 11. <i>P. curta</i>
12. <i>P. hildae</i> | |
| 15. Galea stiffly erect; labellum oblong, 6.5–7 mm long
Galea \pm horizontal; labellum ovate, 4.5–5 mm long | 13. <i>P. erecta</i>
14. <i>P. pedunculata</i> | |
| 16. Dorsal sepal with decurved filiform point 0.5–1.2 cm long; flowers
narrow, held stiffly erect
Dorsal sepal obtuse to acute or acuminate, curved, never with a filiform
point; flowers various | 15. <i>P. fischii</i> | 17 |
| 17. Petals brown, broadly dilated in distal half; labellum narrowed to a
linear section in distal half
Petals green to brownish, not dilated in distal half; labellum not
narrowed to a linear section | 16. <i>P. grandiflora</i> | 18 |
| 18. Labellum tip acute to acuminate
Labellum tip obtuse | | 19
21 |
| 19. Flowers <i>ca</i> 2 cm long
Flowers 3–4.5 cm long | 17. <i>P. longicurva</i> | 20 |
| 20. Flowers <i>ca</i> 3 cm long; labellum acute, 1.4–1.6 cm long
Flowers 3.5–4.5 cm long; labellum acuminate, 1.6–2.2 cm long | 18. <i>P. reflexa</i>
19. <i>P. revoluta</i> | |
| 21. Labellum 0.8–0.9 cm long, not protruding from sinus
Labellum 1–1.4 cm long, protruding from sinus | 20. <i>P. obtusa</i>
21. <i>P. russellii</i> | |
| 22. Stem leaves well developed, spreading
Stem leaves reduced to bracts closely sheathing stem | 22. <i>P. longifolia</i> | 23 |

- | | |
|---|----------------------------|
| 23. Labellum with dark coloured basal appendage | 24 |
| Labellum with basal appendage reduced or absent, if present not dark coloured | 25 |
| 24. Basal appendage <i>ca</i> 3 mm long | 23. <i>P. bicolor</i> |
| Basal appendage <i>ca</i> 1.2 mm long | 24. <i>P. cycnocephala</i> |
| 25. Rosette absent or appearing on lateral growths arising from base of scape | 25. <i>P. daintreana</i> |
| Rosette encircling base of scape (often senescent at flowering time) | 26 |
| 26. Lateral sepals ending in dangling filamentous tails 6–12 cm long | 26. <i>P. woollsii</i> |
| Lateral sepals ending in points less than 2 cm long | 27 |
| 27. Lateral sepals curving upwards in distal half and appearing hooked | 27. <i>P. hamata</i> |
| Lateral sepals deflexed or decurved but not curved upwards | 28 |
| 28. Distal half of labellum covered with appressed short silky hairs | 29 |
| Labellum without silky hairs | 30 |
| 29. Lateral sepals strongly reflexed against ovary, margin flat or recurved; labellum easily visible from side | 28. <i>P. sp. 2.</i> |
| Lateral sepals not reflexed against ovary, margin concave; labellum scarcely visible from side | 29. <i>P. mitchellii</i> |
| 30. Lateral sepals ending in points <i>ca</i> 0.25 cm long; labellum oblong, apex emarginate | 30. <i>P. rufa</i> |
| Lateral sepals ending in points <i>ca</i> 0.3–1.2 cm long; labellum ovate to elliptic, apex entire | 31 |
| 31. Lateral sepals ending in points <i>ca</i> 0.3–0.4 cm long; labellum narrowly elliptic, marginal cilia 1–1.5 cm long | 31. <i>P. sp. 3.</i> |
| Lateral sepals ending in points <i>ca</i> 1.2 cm long; labellum ovate, marginal cilia 2–3 mm long | 32. <i>P. sp. 4.</i> |

1. *Pterostylis bicornis* D. Jones & M. Clements

Small slender herb up to 10 cm tall. Rosette on separate growth arising from base of floral scape, leaves 3–7; petioles broad, 2–4 mm long; blades cordate, 3–7 mm \times 3–5 mm. Flowers 1 or 2, dark green and white, 8–10 mm long, pedicels including ovary 6–10 mm long, stem bracts 3 or 4 and subtending bracts narrowly ovate, acuminate, 8–10 mm \times *ca* 3 mm; dorsal sepal curved in distal two-thirds, obtuse, 8–10 mm \times 2–3 mm, lateral sepals erect, base cuneate, free points tapered, *ca* 2 mm long, barely exceeding galea; petals strongly falcate, apex produced into filiform or slightly clavate tail 4–5 mm long which far exceeds dorsal sepal; labellum claw *ca* 2 mm long, lamina oblong, curved sigmoidally, constricted in distal quarter, 3.4–4 mm \times *ca* 1 mm, basal appendage sparsely branched; column slender, erect, 3.5–4.5 mm long, wings *ca* 1.5 mm long.

Recorded from Mt Maroon in the Moreton district, growing in small humus pockets on bare rock. Flowers winter.

2. *Pterostylis nigricans* D. Jones & M. Clements

Slender plant up to 32 cm tall. Rosette 1, on a separate growth arising from base of floral scape, leaves 3–11; petioles 3–5 mm long; blades bluish green, ovate to sagittate, 0.5–1.6 cm \times 0.5–0.8 cm. Flowers 1–6, well spaced, dark chocolate brown, \pm shiny, erect, 0.9–1 cm long, pedicel including ovary 1–1.2 cm long, stem bracts 2–6, closely sheathing to spreading, ovate to narrowly ovate, acuminate, 1–1.4 cm \times 0.3–0.4 cm; dorsal sepal curved in distal half, bluntly acute, *ca* 1.4 cm \times *ca* 0.45 cm, lateral sepals erect, base cuneate, free points tapered, usually curved forwards, *ca* 3 mm long; petals dark brown with white stripes, obliquely narrowly ovate, falcate, *ca* 9 mm \times *ca* 2.5 mm; labellum claw *ca* 1 mm long, lamina dark brown with narrow white stripes, rhombic to broadly elliptic, scarcely curved, obtuse, *ca* 3 mm \times *ca* 1.5 mm, basal appendage with 3 branches, straight or curved, *ca* 1.5 mm long; column slender, erect, *ca* 5 mm long, wings brown, *ca* 1.5 mm long.

Recorded from Stradbroke I. on sandy soils under light coastal scrub. Flowers autumn–winter.

3. *Pterostylis* sp. 1.

Slender plant up to 15 cm tall. Rosette 1, on a separate growth arising from base of floral scape, leaves 2–6; petioles slender, 0.5–1.5 cm long; blades ovate to sagittate, margin undulate, 0.7–1.5 cm \times 0.6–1 cm. Flowers 1–6, well spaced, green and white, brown at tip of galea, erect, 7–9 mm long, pedicel including ovary 8–10 mm long, stem bracts 3–5, basal ones closely sheathing, rest leaf-like, ovate to narrowly ovate, acuminate, 0.8–1.2 cm long; dorsal sepal curved in distal half, obtuse, *ca* 10 mm \times *ca* 6 mm, lateral sepals erect, base cuneate, free points tapered, *ca* 3 mm long, just extending above galea; petals obliquely narrowly ovate, falcate, acute, *ca* 8 mm \times *ca* 2 mm; labellum claw *ca* 1 mm long, lamina dark brown, very narrowly ovate, slightly curved near tip, bluntly acute, *ca* 4 mm \times *ca* 1.5 mm, basal appendage with 3 branches, straight or curved, *ca* 1.5 mm long; column slender, erect, *ca* 5.5 mm long, wings brown, *ca* 1.5 mm long. **Fig. 58B.**

Recorded from Darling Downs district on shallow soils over rocks or clay loams in open forest, e.g. Girraween National Park, Goombungee, Woogaroo areas. Flowers autumn–winter.

4. *Pterostylis parviflora* R. Br.

Pterostylis whitei F. M. Bailey

Slender plant up to 20 cm tall. Rosettes 1–3 on separate growths arising from base of floral scape, leaves 5–9; petioles narrow, 0.2–1.2 cm long; blades ovate to cordate, margin entire, 0.3–1 cm \times 0.3–0.6 cm. Flowers 1–6, well spaced, green and white, reddish at tip of galea, erect, 6–8 mm long, pedicel including ovary 7–8 mm long, stem bracts 3–6, closely sheathing, narrowly ovate, acuminate, 6–10 mm long; dorsal sepal curved in distal half, obtuse, 6–8 mm \times 4–6 mm, lateral sepals erect, base cuneate, free points tapered, *ca* 1.5–2 mm long, barely reaching galea; petals oblong, strongly falcate, acute, *ca* 6 mm \times *ca* 1.5 mm; labellum claw *ca* 1 mm long, lamina narrowly ovate or nearly oblong, slightly curved, flat or concave, obtuse, *ca* 2.5 mm \times *ca* 1 mm, basal appendage with 3 branches, straight or curved, *ca* 1.5 mm long; column erect, slender, 4–5 mm long, wings brown, *ca* 1.5 mm long.

Recorded from the Glasshouse Mts in the Moreton district, on shallow clay-loams. Flowers autumn–winter.

5. *Pterostylis furcata* Lindl.**SICKLE GREENHOOD**

Pterostylis falcata R. Rogers

Slender plant up to 30 cm tall. Rosette radical, encircling base of scape or leaves scattered up stem, leaves 3–8; petioles 5–10 mm long; blades ovate to narrowly ovate, 3–9 cm \times 1–2.5 cm. Flower 1, green and white, erect, large with prominent sickle-shaped galea, segments often loosely adherent, *ca* 4–6 cm long, pedicel including ovary 2–3 cm long, stem bracts 2 or 3, loosely sheathing, *ca* 4 cm long; dorsal sepal tapered, broadest at base, apex long acuminate, flat or decurved, 6–9 cm \times 2–2.3 cm, lateral sepals erect, not closely embracing galea, united in basal 2–2.5 cm, sinus deeply V-shaped, free points erect or recurved, 3–5 cm long, exceeding galea by 2–3.5 cm; petals narrowly ovate, falcate, acuminate, 4–6 cm \times 0.7–1.1 cm; labellum claw *ca* 3 mm long, lamina dark brown, linear-ovate, curved, 2–2.5 cm \times 0.3–0.4 cm, not protruding from sinus in reflexed position, basal appendage penicillate, curved, *ca* 4.5 mm long; column erect, 1.5–2 cm long, wings *ca* 6–8 mm long.

Recorded once from near Mt Norman in the Darling Downs district, on damp soil beside a stream. Flowers late spring.

6. *Pterostylis ophioglossa* R. Br.**SNAKE TONGUE GREENHOOD**

Pterostylis tenuicauda Kränzlin; *P. ophioglossa* var. *collina* Rupp

Slender plant up to 25 cm tall. Rosette radical, encircling base of scape, leaves 4–7; petioles 5–8 mm long; blades ovate to oblong, margin entire or undulate, 2.5–4 cm \times 1–2 cm. Flower 1, erect or semi-nodding, green and white, tan and white or sometimes reddish brown, *ca* 2.4–3 cm long, pedicel including ovary 1.5–2.5 cm long, stem bracts 2, loosely sheathing, *ca* 1.4–2 cm long; dorsal sepal tapered, broadest at base, apex acuminate to filiform, 4–4.5 cm \times 1.4–1.8 cm, lateral sepals erect, closely embracing galea, united in basal 1–1.4 cm, sinus very shallow, free points filiform, 2–4 cm long,

exceeding galea by 1.2–3 cm; petals strongly falcate, acute to obtuse, 2.7–3.5 cm \times 0.6–0.8 cm; labellum claw *ca* 2 mm long, lamina narrowly ovate, strongly curved in distal half, apex deeply notched, lobes divergent, 1.2–1.5 cm \times *ca* 0.3 cm, just protruding from sinus in reflexed position, basal appendage penicillate, curved, *ca* 4–5 mm long; column slender, erect or curved, 1.3–1.7 cm long, wings 6–9 mm long.

Moreton and Darling Downs districts, especially on sandy soils in light open forest; common. Flowers autumn–winter.

A green-flowered variant from rainforest margins and tall open forest is under investigation.

7. *Pterostylis baptistii* Fitzg.

KING GREENHOOD

Slender plant up to 40 cm tall. Rosette radical, encircling base of scape, leaves 3–8; petioles *ca* 6 mm long; blades ovate to oblong, 3–6 cm \times 1.5–2 cm. Flower 1, erect, green and white with reddish brown markings towards tip of galea, *ca* 4–6 cm long, pedicel including ovary 2.5–3 cm long, stem bracts 1–3, closely sheathing, *ca* 2.5–3.5 cm long; dorsal sepal tapered, broadest at base, apex erect, flat or decurved, acuminate, 6–7.5 cm \times 2.3–2.6 cm, lateral sepals erect, not closely embracing galea, united in basal 2–2.5 cm, sinus shallowly V-shaped, free points tapered, 2.3–2.6 cm long, swept back and exceeding galea by 1–1.5 cm; petals obliquely narrowly ovate to obovate, slightly falcate, acuminate, 5–6 cm \times 1.3–1.5 cm; labellum claw *ca* 3 mm long, lamina red-brown, oblong to narrowly ovate, suddenly constricted and deflexed or curved to one side at apex, 1.7–2.7 cm \times *ca* 0.5 cm, not protruding from sinus in reflexed position, basal appendage penicillate, curved, 4–6 mm long; column erect, slender, 2.4–2.8 cm long, wings *ca* 8–10 mm long.

Moreton and Wide Bay districts, beside streams, among rocks and under bracken in light to dense eucalypt forest. Flowers autumn to spring.

8. *Pterostylis nutans* R. Br.

NODDING GREENHOOD

Slender plant up to 20 cm tall. Rosette radical, encircling base of scape, leaves 3–6; petioles 5–10 mm long; blades ovate to oblong, margin entire or undulate, 2.5–6 cm \times 1.2–2 cm. Flower 1, semi-nodding to strongly nodding with ovary curved, green and white with reddish suffusions towards tip of galea, *ca* 1.8–2.8 cm long, pedicel including ovary 1.5–3.5 cm long, stem bracts 2, closely sheathing, *ca* 1.5–3 cm long; dorsal sepal tapered, broadest at base, apex obtuse to acute, 2–3.5 cm \times 1.4–2 cm, lateral sepals not closely embracing galea, united in basal 6–8 mm, sinus shallowly V-shaped, free points tapered, 0.7–1.5 cm long, recurved, not or just exceeding galea, petals strongly falcate, acute, 1.8–2.7 cm \times 0.6–0.8 cm; labellum claw *ca* 2 mm long, lamina dark brown to blackish, ovate to narrowly ovate, curved or bent near middle, 1–1.4 cm \times 0.4–0.6 cm, shortly to prominently hispid, not protruding from sinus in reflexed position, basal appendage penicillate, curved, *ca* 5 mm long; column slender, curved or bent in proximal quarter, slender, 1.5–1.8 cm long, wings *ca* 6–7 mm long.

Two varieties may occur in the region:

- | | |
|--|--|
| 1. Flowers 1.8–2.7 cm long, strongly nodding; labellum sharply curved or bent near middle, sparsely to strongly hispid | <i>P. nutans</i> var. <i>nutans</i> |
| Flowers 1.2–1.3 cm long, partially nodding; labellum curved near middle, strongly hispid | <i>P. nutans</i> var. <i>hispidula</i> |

P. nutans* var. *nutans (*P. mathewsii* Cheeseman) (Fig. 58C.) is widespread and common in moist habitats of the coast and mountains in Moreton and Wide Bay districts. Flowers autumn, winter and spring. Specimens very similar to the taxon known as ***P. nutans* var. *hispidula*** (Fitzg.) C. Moore & Betche (*P. hispidula* Fitzg.) have been collected sporadically in the Moreton district, e.g. Lamington National Park, Crows Nest area. Flowers autumn–winter.

P. nutans is a variable taxon at present under study.

9. *Pterostylis acuminata* R. Br.

SHARP GREENHOOD

Slender plant up to 25 cm tall. Rosette radical, encircling base of scape, leaves 3–8; petioles *ca* 1.2 cm long; blades ovate to oblong, 3–4.5 cm \times 1.5–2 cm. Flower 1, erect or slightly nodding, green and white, brownish red towards tip of galea, *ca* 2.5–3 cm long,

pedicel including ovary 1.5–1.8 cm long, stem bracts 1 or 2, closely sheathing, *ca* 1.2 cm \times *ca* 0.4 cm; dorsal sepal tapered, broadest at base, apex flat or decurved, acuminate, 3.8–4.2 cm \times 1.4–1.7 cm, lateral sepals erect, not closely embracing galea, united in basal 7–8 mm, sinus deeply V-shaped, free points tapered, 2.2–2.4 cm long, ending in filiform tails which are swept back and exceed galea by *ca* 10 mm; petals obliquely narrowly ovate, falcate, acuminate, 2.4–2.6 cm \times 0.4–0.5 cm; labellum claw *ca* 1.5 mm long, lamina red-brown, very narrowly ovate, acuminate, curved in upper half, protruding from sinus in reflexed position, 1.5–1.9 cm \times 0.3–0.35 cm, basal appendage penicillate, slightly curved, 3–4 mm long; column erect, slender, 1.3–1.4 cm long, wings *ca* 5 mm long.

Recorded mainly from coastal areas of Moreton district, on sandy soil under bracken fern or grass trees, e.g. Stradbroke I., also mountainous areas, e.g. Buderim, Great Dividing Ra. Flowers autumn–winter.

10. *Pterostylis pedoglossa* Fitzg.

PRAWN GREENHOOD

Slender plant up to 18 cm tall. Rosette radical, encircling base of scape, leaves 3–6; petioles 2–6 mm long; blades ovate to cordate, margin entire, 0.8–1.2 cm \times 0.5–0.8 cm. Flower 1, erect, green and white, sometimes with brownish suffusions at tip of galea, *ca* 1.4–1.7 cm long, pedicel including ovary 1.5–2.5 cm long, stem bracts 1–2, loosely sheathing, *ca* 0.8–1.2 cm long; dorsal sepal tapered, broadest at base, 1.5–2 cm \times 0.8–1 cm, apex drawn into a filiform point 1.5–2.5 cm long, lateral sepals erect, closely embracing galea, united in basal 7–9 mm, sinus very deep, free points filiform, 2–3.5 cm long, exceeding galea by 1.5–3 cm; petals strongly falcate, broadest near base, acute to subacute, 1–1.4 cm \times 0.25–0.35 cm; labellum claw *ca* 1.5 mm long, lamina oblong, very slightly curved near apex, apex obtuse, not visible through sinus, *ca* 3.5–4 mm \times 2–2.5 mm, basal appendage penicillate, straight or bent near apex, *ca* 3–4 mm long; column slender, obliquely erect, 8–9 mm long, wings 2.5–3 mm long.

Plants tentatively identified as this species have been located at Lamington National Park in the Moreton district, on wet peaty soil under low shrubs. Flowers autumn.

11. *Pterostylis curta* R. Br.

BLUNT GREENHOOD

Slender plant up to 25 cm tall. Rosette radical, encircling base of scape, leaves 3–7; petioles 0.5–2 cm long; blades ovate to oblong, margin entire or crisped, 4–8 cm \times 2–2.5 cm. Flower 1, erect, green and white with reddish brown suffusions towards tip of galea, *ca* 2.5–3.5 cm long, pedicel including ovary 3–4 cm long, stem bracts 1 or 2, closely sheathing, *ca* 2.5–3.5 cm long; dorsal sepal tapered, broadest at base, apex flat, obtuse, 3.5–4 cm \times 1.6–1.8 cm, lateral sepals erect, not closely embracing galea, united in basal 1.6–2 cm, sinus shallowly V-shaped, free points tapered, 1.2–1.5 cm long, swept back, not exceeding galea; petals obliquely oblong, slightly falcate, acute, 3–3.5 cm \times 0.7–0.9 cm; labellum claw *ca* 2 mm long, lamina dark red-brown, oblong to narrowly ovate, twisted in distal half or near apex, 1.2–1.5 cm \times 0.4–0.6 cm, not protruding from sinus in reflexed position, basal appendage penicillate, curved, *ca* 4 mm long; column slender, erect, 1.4–1.6 cm long, wings *ca* 4–6.5 mm long.

Moreton and Darling Downs districts in dense forest, e.g. Bunya Mts, Lamington National Park, Murphys Ck area. Flowers spring.

12. *Pterostylis hildae* Nicholls

Slender plant up to 20 cm tall. Rosette radical, encircling base of scape, leaves 2 or 3; petioles 1–3 cm long; blades ovate, margin entire or crisped, 4–8 cm \times 2–2.5 cm. Flower 1, erect or semi-nodding, green and white with reddish brown markings towards tip of galea, *ca* 2–2.5 cm long, pedicel including ovary 2–2.5 cm long, stem bracts 2 or 3, closely sheathing, *ca* 1.5 cm long; dorsal sepal tapered, broadest at base, apex flat or decurved, obtuse, 2.8–3 cm \times *ca* 1.2 cm, lateral sepals erect, not closely embracing galea, united in basal 1.2–1.4 cm, sinus deeply V-shaped, free points 8–10 mm long, not exceeding galea; petals linear-oblong, falcate, acute, 2.2–2.5 cm \times *ca* 0.4 cm; labellum claw *ca* 3 mm long, lamina obovate, with a dark brown central ridge, 0.9–1.1 cm \times 0.35–0.4 cm, not protruding from sinus in reflexed position, basal appendage penicillate, curved, *ca* 3 mm long; column slender, erect, 1.2–1.4 cm long, wings *ca* 3.5–4 mm long.

Moreton district in moist forests particularly on margins of rainforest. Flowers winter–spring.

13. *Pterostylis erecta* Hunt**ERECT MAROONHOOD**

Slender plant up to 35 cm tall. Rosette radical, encircling base of scape, leaves 4–6, deep green; petioles *ca* 0.5–1.2 cm long; blades ovate, oblong or obovate, margin entire or crisped, 3–5.5 cm \times 1.5–2.5 cm. Flower 1, stiffly erect, greenish brown to dark brown, *ca* 1.8–2 cm long, pedicel including ovary *ca* 3–5 cm long, stem bracts 1 or 2, closely sheathing, *ca* 1.4–2.2 cm long; dorsal sepal tapered, broadest at base, apex shortly acuminate, 2–2.4 cm \times 0.8–1.2 cm, lateral sepals erect, not closely embracing galea, united in basal *ca* 2 cm, sinus deeply V-shaped, free points erect, 1.6–2 cm long, exceeding galea by 1.2–1.4 cm; petals oblong, falcate, acute, 1.5–1.7 cm \times *ca* 0.3 cm; labellum claw *ca* 1 mm long, lamina dark brown, shiny, oblong, tapered in distal quarter to obtuse apex, 6.5–7 mm \times *ca* 2 mm, not protruding from sinus in reflexed position, basal appendage penicillate, straight, *ca* 2 mm long; column slender, erect, straight, 1–1.4 cm long, wings *ca* 3.5–4 mm long.

Among rocks and on moist soils in fairly dense forest; common. Flowers winter–spring.

This species has been commonly confused with *P. pedunculata* R. Br. in Queensland.

14. *Pterostylis pedunculata* R. Br.**MAROONHOOD**

Pterostylis semirubra F. Muell.

Slender plant up to 30 cm tall. Rosette radical, encircling base of scape, leaves 3–6, deep green; petioles *ca* 5–10 mm long; blades ovate to oblong, margin entire or crisped, 2.5–5 cm \times 1.5–2.5 cm. Flower 1, erect, green and white at base, dark red-brown or blackish towards tip, *ca* 2 cm long, on pedicel including ovary *ca* 3–3.5 cm long, stem bracts 1 or 2, closely sheathing, 2–3 cm long; dorsal sepal tapered, broadest at base, apex shortly acuminate, 2.5–2.8 cm \times 0.9–1.2 cm, lateral sepals erect, not closely embracing galea, united in basal *ca* 1.4 cm, sinus broadly V-shaped, free points erect or somewhat recurved, 2–2.5 cm long, exceeding galea by 1.3–1.8 cm; petals oblong, falcate, acute, 1.5–1.7 cm \times *ca* 0.35 cm; labellum claw *ca* 1 mm long, lamina dark red-brown, ovate, obtuse, 4.5–5.5 mm \times *ca* 2.5 mm, not protruding from sinus in reflexed position, basal appendage penicillate, straight, *ca* 1.5 mm long; column slender, erect, straight, 1–1.2 cm long, wings *ca* 4.5 mm long.

Reported to occur in the Stanthorpe region but confirmatory specimens lacking; grows among rocks in shade in light open forest, often beside streams. Flowers spring.

Most records of this species from Queensland have been misidentifications of *P. erecta* Hunt.

15. *Pterostylis fischii* Nicholls

Slender plant up to 20 cm tall. Rosette forming on juvenile plants only, leaves 3–5; petioles *ca* 3.5 mm long; blades elliptic to ovate, 0.8–1.5 cm \times 0.6–0.8 cm. Flower 1, stiffly erect, green and white with brown suffusions towards tip of galea, narrow, *ca* 2–2.5 cm long, pedicel including ovary 1.5–2.5 cm long, stem bracts 4–6, closely sheathing, *ca* 1–1.5 cm long; dorsal sepal tapered, broadest at base, apex with filiform point 0.5–1.2 cm long, 3.6–4 cm \times 1.3–1.4 cm, lateral sepals erect, closely embracing galea, united in basal 1.2–1.4 cm, sinus shallowly V-shaped, free points tapered at base, 1.8–2.5 cm long, becoming filiform and exceeding galea by 1.2–1.7 cm; petals strongly falcate, dilated near apex, acute, 1.8–2.4 cm \times 0.4–0.6 cm; labellum claw *ca* 1.5 mm long, lamina brown towards apex, ovate to obovate, obtuse, 8–9 mm \times *ca* 3 mm, not protruding from sinus in any position, basal appendage penicillate, curved, *ca* 2.5 mm long; column slender, erect, 1.1–1.25 cm long, wings 5–6 mm long.

Recorded from Girraween National Park in the Darling Downs district, among rocks in open forest. Flowers autumn.

16. *Pterostylis grandiflora* R. Br.**COBRA GREENHOOD**

Slender plant up to 35 cm tall. Rosette forming on juvenile plants only, leaves 3–7, dark green; petioles 1–1.5 cm long; blades ovate, margin crisped, 0.7–2.5 cm \times 0.5–1.4 cm. Flower 1, green and white, heavily suffused red-brown in upper half, erect, 3–3.5 cm long, pedicel including ovary *ca* 2.5–3 cm long, stem bracts 6–9, upper ones leaf-like,

narrowly ovate, acuminate, 4–6 cm \times 0.7–0.8 cm; dorsal sepal tapered, broadest at base, apex acuminate, 5.5–6 cm \times 1.2–1.6 cm, lateral sepals erect, closely embracing galea, united in basal 1.2–1.6 cm, sinus shallowly V-shaped, free points filiform, erect, 3–5 cm long, exceeding galea by 2.5–3.5 cm; petals obliquely narrowly ovate, falcate, dilated in upper half, acuminate, margin undulate, 4–4.6 cm \times 0.8–1 cm; labellum claw *ca* 3 mm long, lamina elliptic in basal half then narrowed to linear section *ca* 8 mm long, apex \pm dilated, curved, 1.6–2.2 cm \times 0.3–0.4 cm, not protruding from sinus in reflexed position, basal appendage penicillate, curved, *ca* 3.5 mm long; column slender, erect, 1.5–1.8 cm long, wings *ca* 6 mm long.

Moreton district in high rainfall regions, usually in mountainous terrain. Flowers winter.

17. *Pterostylis longicurva* Rupp

Slender plant up to 15 cm tall. Rosette forming on juvenile plants only, leaves 4–6; petioles 1.4–1.7 cm long; blades ovate, 1.2–1.7 cm \times 0.8–1.2 cm. Flower 1, erect, green and white, *ca* 2–2.2 cm long, pedicel including ovary 2–2.5 cm long, stem bracts 4 or 5, leaf-like, narrowly ovate, not closely sheathing, apex filiform, 2–3.5 cm \times *ca* 0.5 cm; dorsal sepal tapered, broadest at base, apex obtuse, 2.6–2.8 cm \times 1–1.4 cm, lateral sepals erect, closely embracing galea, united in basal *ca* 10 mm, sinus shallowly V-shaped, free points filiform, erect, 1.5–2 cm long, exceeding galea by 1–1.4 cm; petals linear, falcate, obtuse, 1.8–2.5 cm \times *ca* 0.3–0.4 cm; labellum claw *ca* 1 mm long, lamina narrowly ovate, curved in distal half, tapered in distal half to a dark brown linear portion *ca* 5 mm long, 1.3–1.5 cm \times *ca* 0.2 cm, protruding from sinus in reflexed position, basal appendage penicillate, curved, *ca* 2.5 mm long; column slender, erect, 1–1.2 cm long, wings *ca* 4 mm long.

Girraween National Park in the Darling Downs district, among rocks in light open forest. Flowers autumn.

18. *Pterostylis reflexa* R. Br.

Slender plant up to 25 cm tall. Rosette forming on juvenile plants only, leaves 3–7; petioles 1–1.2 cm long; blades ovate, 2–3 cm \times 0.7–1.2 cm. Flower 1, erect, green and white heavily suffused with brown, *ca* 3 cm long, pedicel including ovary *ca* 2 cm long, stem bracts 4–6, upper ones leaf-like, narrowly ovate, apex long acuminate, 1.5–2 cm \times *ca* 0.35 cm, basal ones sheathing; dorsal sepal tapered, broadest at base, curved throughout, apex long acuminate, 4.4–4.8 cm \times *ca* 1.5 cm, lateral sepals erect, closely embracing galea, united in basal 1.5 cm, sinus shallowly V-shaped, free points tapered at base then filiform, erect, 2.8–3 cm long, exceeding galea by *ca* 2 cm; petals obliquely narrowly ovate, falcate, acute, 3–3.5 cm \times *ca* 0.7 cm; labellum claw *ca* 2 mm long, lamina dark brown, narrowly ovate, curved, tapered to acute apex, 1.4–1.6 cm \times *ca* 0.3 cm, just protruding from sinus in reflexed position; basal appendage penicillate, curved, *ca* 3 mm long; column slender, erect, 1.3–1.5 cm long, wings *ca* 5 mm long.

Recorded from Amiens in the Darling Downs district, around the base of large granite boulders. Flowers autumn.

19. *Pterostylis revoluta* R. Br.

AUTUMN GREENHOOD

Pterostylis speciosa Hunt

Slender plant up to 20 cm tall. Rosette forming on juvenile plants only, leaves 7–12; petioles 1–1.7 cm long; blades ovate, 2–4 cm \times 0.7–1.7 cm. Flower 1, semi-nodding, green and white, some red-brown suffusions towards apex, 3.5–4.5 cm long, pedicel including ovary 2–2.5 cm long, stem bracts 5–7, upper ones leaf-like, apex long acuminate, 2.5–3 cm \times *ca* 1.5 cm, basal ones closely sheathing; dorsal sepal tapered, broadest at base, curved throughout, apex acuminate, 4.5–5 cm \times 1.3–1.5 cm, lateral sepals erect, closely embracing galea, united in basal *ca* 10 mm, sinus shallowly V-shaped, free points tapered at base then filiform, erect or recurved, 3–3.4 cm long, exceeding galea by *ca* 2 cm; petals falcate, acuminate, 3.3–3.5 cm \times 0.6–0.7 cm; labellum claw *ca* 2 mm long, lamina dark brown, narrowly ovate, curved, tapered to an acuminate apex, 1.6–2 cm \times *ca* 0.3 cm, just protruding from sinus in reflexed position,

basal appendage penicillate, straight or curved, *ca* 4 mm long; column slender, erect, 1.4–1.6 cm long, wings *ca* 5 mm long.

Moreton and Darling Downs districts, often among rocks on shaded slopes, e.g. Bunya Mts, Stradbroke I. Flowers autumn.

20. *Pterostylis obtusa* R. Br.

BLUNT GREENHOOD

Slender plant up to 25 cm tall. Rosette forming on juvenile plants only, leaves 4–7, dark green; petioles 0.8–1.4 cm long; blades ovate, margin crisped, 1.5–3 cm \times 0.8–1.5 cm. Flower 1, green and white, shiny, erect, 1.8–2.5 cm long, pedicel including ovary *ca* 1.5–3.5 cm long, stem bracts 5–7, leaf-like, narrowly ovate, acuminate, 2–3 cm \times 0.5–0.6 cm; dorsal sepal tapered, broadest at base, apex acuminate, 2.8–3.3 cm \times 1.2–1.4 cm, lateral sepals erect, closely embracing galea, united in basal 1.2–1.4 cm, upper margin gibbous, sinus shallowly notched, free points filiform, erect, apex often \pm clavate, 1.6–1.9 cm long, exceeding galea by 6–10 mm; petals obliquely narrowly ovate, dilated near apex, acute, 2.2–2.5 cm \times 0.5–0.6 cm; labellum claw *ca* 1 mm long, lamina dark brown to blackish, narrowly ovate to oblong, obtuse, not protruding from sinus in reflexed position, 8–9 mm \times *ca* 2.5 mm; basal appendage penicillate, curved, 2.5–3 mm long; column erect, slender, 1–1.3 cm long, wings *ca* 4 mm long.

Widespread in moist habitats in the Moreton and Darling Downs districts; common. Flowers autumn–winter.

21. *Pterostylis russellii* Hunt

Slender plant up to 25 cm tall. Rosette forming on juvenile plants only, leaves 4–7; petioles 0.8–1.7 cm long; blades dark green, ovate, margin entire or crisped, 2–4.5 cm \times 1.6–2 cm. Flower 1, green and white, shiny, 2–2.8 cm long, pedicel including ovary *ca* 1.5–2 cm long, stem bracts 5–7, leaf-like, narrowly ovate, acuminate, 3–3.5 cm \times 0.5–0.6 cm; dorsal sepal tapered, broadest at base, acuminate, 3–3.5 cm \times 1.2–1.5 cm, lateral sepals erect, closely embracing galea, united in basal 0.8–1.2 cm, upper margin gibbous, sinus very shallowly notched, free points filiform, erect, 1.6–2.5 cm long, exceeding galea by 1.2–1.6 cm; petals obliquely narrowly ovate, strongly falcate, acute, 2.2–2.7 cm \times 0.6–0.7 cm; labellum claw *ca* 2 mm long, lamina dark brown to blackish, narrowly ovate to oblong, obtuse, just protruding from sinus in reflexed position, 1–1.4 cm \times *ca* 0.8 cm, basal appendage penicillate, curved, 3.5–4 mm long; column erect, slender, 1–1.4 cm long, wings *ca* 5 mm long.

Widespread in moist habitats of Moreton and southern Darling Downs districts; common. Flowers winter.

22. *Pterostylis longifolia* R. Br.

TALL GREENHOOD

Slender plant up to 40 cm tall. Rosette forming on juvenile plants only, leaves 2–4, dark green, linear-ovate, acute, 3.5–8.5 cm \times 0.35–0.7 cm, usually held well above soil level. Flowers 1–8, opening sequentially up raceme, obliquely erect, green with translucent patches, 1.2–1.5 cm long, pedicel including ovary 1–1.3 cm long, stem bracts 4–8, leaf-like, narrowly ovate to oblong, acute, 3–7 cm \times 0.8–1 cm; dorsal sepal curved, abruptly decurved near apex, obtuse, 1.2–1.5 cm \times *ca* 1 cm, lateral sepals deflexed, ovate, united for basal *ca* 10 mm, tips free, divergent, tapered, *ca* 1.2 cm \times *ca* 0.7 cm; petals unequally narrowly ovate, blunt, 1.2–1.3 cm \times *ca* 0.4 cm; labellum claw *ca* 2 mm long, lamina dark greenish black, oblong, base swollen and fleshy, apex upturned, emarginate, curved, channelled beneath, 5–6 mm \times 2–2.5 mm, papillose; column incurved, slender, 1.2–1.5 cm long, wings rectangular, *ca* 3 mm long. **Fig. 58D.**

Widespread in high rainfall regions of Moreton district, usually on shaded slopes or close to streams, e.g. Springbrook, Brisbane Forest Park, Crows Nest area. Flowers winter–spring.

Queensland specimens are never as tall and robust as those in temperate regions.

23. *Pterostylis bicolor* M. Clements & D. Jones

Slender plant up to 40 cm tall. Rosette radical, encircling base of scape, leaves 5–12, ovate to narrowly ovate, 1.8–2.4 cm \times 0.9–1.2 cm. Flowers 3–14, green with a conspicuous dark labellum appendage, 7–8 mm long, pedicel including ovary 6–8 mm long, stem bracts 6–11 and subtending bracts narrowly ovate, closely sheathing, 4–6 mm

× *ca* 3 mm; dorsal sepal abruptly decurved to obtuse apex, 7–8 mm × *ca* 3 mm, lateral sepals deflexed, concave, united nearly to apex, distal margin incurved, 5–6 mm × *ca* 4 mm; petals rhombic, *ca* 8 mm × *ca* 4 mm; labellum claw *ca* 7 mm long, lamina pale green, membranous, ± rectangular, emarginate, *ca* 3 mm × *ca* 2 mm, basal appendage greenish black, prominent, *ca* 3 mm long, with obtuse beak *ca* 0.3 mm long; column slender, curved, 7–8 mm long, wings ± rectangular, *ca* 2.5 mm long.

Western Moreton and Darling Downs districts usually growing among rocks in sparse open forest; common. Flowers spring.

This species has been confused with *P. mutica* R. Br. in Queensland.

24. *Pterostylis cyncephala* Fitzg.

SWAN GREENHOOD

Slender plant up to 40 cm tall. Rosette radical, encircling base of scape, leaves 5–10, ovate to narrowly ovate, 1.2–3 cm × 1–1.2 cm. Flowers 5–25, green with a conspicuous dark labellum appendage, obliquely erect, 7–8 mm long, pedicel including ovary 6–8 mm long, stem bracts 5–9 and subtending bracts narrowly ovate, closely sheathing, 1.2–1.6 cm × *ca* 0.4 cm; dorsal sepal abruptly decurved to obtuse apex, 6–7 mm × *ca* 4 mm, lateral sepals deflexed, concave, united for $\frac{3}{4}$ their length, distal margins incurved, 3–4 mm × *ca* 4 mm; petals ± oblong, *ca* 8 mm × *ca* 5 mm; labellum claw *ca* 4 mm long, lamina pale green, membranous, ± rectangular, emarginate, *ca* 2 mm × *ca* 2 mm, basal appendage greenish black, *ca* 1.2 mm long, with a prominent forward facing beak *ca* 0.4 mm long; column slender, curved, 6–7 mm long, wings ± rectangular, *ca* 2.5 mm long.

Recorded from Wyberba and Ballandean in the Darling Downs district, among rocks in light open forest. Flowers spring.

25. *Pterostylis daintreana* F. Muell. ex Benth.

Slender plant up to 30 cm tall. Rosettes 1 or 2, on separate growths arising from base of floral scape, leaves 4–7; petioles narrow, *ca* 5 mm long; blades cordate, margin entire or crenate, 1–1.6 cm × 0.5–0.7 cm. Flowers 2–10, erect, green and white, 1–1.2 cm long, pedicel including ovary 8–10 mm long, stem bracts 3–5 and subtending bracts narrowly ovate, sheathing or spreading, 0.8–2 cm long; dorsal sepal nearly flat along top then abruptly decurved at right angles near apex, ending in filiform point *ca* 4 mm long, 1.3–1.5 cm × *ca* 0.5 cm, lateral sepals deflexed, base cuneate, free points tapered, *ca* 8 mm long; petals obliquely oblong, acute, *ca* 8 mm × *ca* 2.5 mm, gibbous on upper side, a few coarse cilia on inner surface; labellum claw *ca* 1 mm long, lamina ovate-oblong, obtuse, 4–6 mm × 1.5–2 mm, 3-lobed, 2 lateral lobes fleshy and raised at base, basal appendage absent; column erect, fairly stout, straight, semicircular, wings *ca* 2 mm long.

Recorded from Girraween National Park in the Darling Downs district and Lamington Plateau and Springbrook in the Moreton district, on thin layers of soil over rocks or on shallow clay-loams. Flowers autumn.

26. *Pterostylis woollsii* Fitzg.

LONG TAILED GREENHOOD

Slender plant up to 45 cm tall. Rosette radical, encircling base of scape, leaves 5–9, ovate to oblong, 2–3 cm × 1–1.3 cm, usually senescent at flowering time. Flowers 1–5, usually stiffly erect, green with pale brown suffusions and transparent sections, pedicel including ovary 3–3.5 cm long, stem bracts 2–5 and subtending bracts narrowly ovate, tips acuminate to filiform, 2.5–3.5 cm × *ca* 0.5 cm; dorsal sepal broad at base, 3–4.5 cm long, apex filiform, 1.5–3 cm long, lateral sepals deflexed, ovate, sharply recurved in basal quarter, somewhat concave, ending in dangling filamentous tails 6–12 cm long, upper margin of fused part lacking cilia; petals obliquely narrowly ovate, acuminate, proximal inner edges hardly thickened, ciliate on upper margin, 2.3–2.6 cm × *ca* 0.6 cm, apex filiform, ± 4 mm long; labellum claw *ca* 3 mm long, lamina oblong, basal swellings 2, a prominent erect basal appendage continuous with longitudinal ridge, apex upturned, emarginate, basal cilia scattered, longest *ca* 2 mm long, marginal cilia 6 or 7 pairs, spreading, 2–6 mm long; column slender, curved, 1.5–1.8 cm long, wings ± rectangular, *ca* 5 mm long.

Recorded from Stanthorpe-Wyberba area of the Darling Downs district among rocks in light open forest. Flowers late spring–early summer.

27. *Pterostylis hamata* Blackmore & Clemesha

Slender plant up to 35 cm tall. Rosette radical, encircling base of scape, leaves 7–12, obovate to ovate, 2.5–3.5 cm \times 1–1.2 cm, usually senescent at flowering. Flowers 3–9, somewhat nodding, reddish brown with translucent patches, pedicel including ovary 2.5–3 cm long, stem bracts 5–8 and subtending bracts narrowly ovate, closely sheathing, 2.5–2.7 cm \times ca 0.6 cm; dorsal sepal broad at base, ca 2 cm long, apex filiform, ca 7.5 mm long, lateral sepals deflexed, ovate, concave, ending in fine tapered points which curve upwards and approach point of dorsal sepal, upper margin of fused part without cilia; petals obliquely narrowly ovate, acute, proximal inner edges thickened into protruberances that touch each other and close off base of galea, ciliate along upper margin, ca 1.3 cm \times ca 0.5 cm; labellum claw ca 3 mm long, lamina narrowly ovate, upper surface concave, ca 5 mm \times ca 2 mm, basal cilia 6–8, ca 1 mm long, marginal cilia 4 or 5 pairs, pointing forwards, 1–2.5 mm long, central groove broad; column slender, curved, 1–1.1 cm long, wings \pm rectangular, \pm 4 mm long.

Recorded from the vicinity of Stanthorpe and areas to the south-west, in the Darling Downs district, in light open cypress pine forest. Flowers late spring.

28. *Pterostylis* sp. 2.

Slender plant up to 45 cm tall. Rosette radical, encircling base of scape, leaves 7–12, obovate to oblong, 3–4 cm \times 0.5–1 cm, usually senescent at flowering. Flowers 3–10, obliquely erect, green with light brown markings and translucent patches, pedicel including ovary 2.5–3 cm long, stem bracts 6–10 and subtending bracts narrowly ovate, closely sheathing, 1.4–1.6 cm \times ca 0.5 cm; dorsal sepal broad at base, ca 1.5 cm long, apex filiform, ca 5 mm long, lateral sepals deflexed, ovate, recurved sharply in basal quarter, flat, ending in fine tapered divergent points ca 1.2 cm long, upper margin of fused part with numerous cilia ca 1 mm long; petals translucent, obliquely narrowly ovate, acuminate, proximal inner edges thickened but not touching at base of flower, ciliate along upper margin, ca 1.2 cm \times ca 0.5 cm; labellum claw ca 2.5 mm long, lamina fleshy, narrowly ovate, ca 5 mm \times ca 2 mm, densely sericeous in distal half, basal cilia numerous, ca 0.3 mm long, marginal cilia 4–6 pairs, spreading, 2–4.5 mm long, central groove shallow; column slender, curved, 1–1.1 cm long, wings \pm rectangular, ca 3 mm long.

Recorded from Goombungee in the Darling Downs district, in light open forest. Flowers late spring–summer.

This species has been confused with *P. setifera* M. Clements, Matthias & D. Jones.

29. *Pterostylis mitchellii* Lindl.

Pterostylis gibbosa R. Br. subsp. *mitchellii* (Lindl.) Blackmore & Clemesha

Slender plant up to 45 cm tall. Rosette radical, encircling base of scape, leaves 7–12, oblong to obovate, 3–4 cm \times 0.5–1 cm, usually senescent at flowering time. Flowers 3–15, obliquely erect or semi-nodding, green with pale brown markings or wholly pale reddish brown, pedicel including ovary 2.5–3 cm long, stem bracts 6–10 and subtending bracts narrowly ovate, closely sheathing, 1.5–2 cm \times ca 0.6 cm; dorsal sepal broad at base, ca 1.7 cm long, apex filiform, ca 5 mm long, lateral sepals deflexed, ovate, recurved sharply in basal quarter, somewhat concave, ending in fine tapered divergent points ca 10 mm long, upper margin of fused part with numerous cilia ca 1 mm long; petals obliquely narrowly ovate, acuminate, apex curved, proximal inner edges thickened into protuberances that touch at base of galea, ciliate on both margins, ca 1.3 cm \times ca 0.5 cm; labellum claw ca 3 mm long, lamina fleshy, narrowly ovate, ca 5 mm \times ca 1.6 mm, densely sericeous in distal half, basal cilia numerous, longest ca 1 mm long, marginal cilia 5 or 6 pairs, spreading, 2–4 mm long, central groove narrow, fairly deep; column slender, curved, 9–10 mm long, wings \pm rectangular, ca 3 mm long.

Recorded from Burnett, Darling Downs and western parts of Moreton districts, in light open forest often under cypress pine. Flowers late spring.

30. *Pterostylis rufa* R. Br.**RUSTYHOOD**

Slender plant up to 25 cm tall. Rosette radical, encircling base of scape, leaves 5–9, ovate

to obovate, 1.5–2.7 cm \times 0.7–1.3 cm, usually senescent at flowering time. Flowers 3–9, usually semi-nodding, green with pale brown markings or wholly reddish brown, pedicel including ovary 1.8–2.3 cm long, stem bracts 3–5 and subtending bracts narrowly ovate, closely sheathing, 1.5–2 cm \times ca 0.4 cm; dorsal sepal broad at base, ca 1.7 cm long, apex filiform, 2.5 mm long, lateral sepals deflexed, narrowly ovate, recurved sharply in basal quarter, somewhat concave, ending in short outcurved points ca 2.5 mm long, upper margin of fused part lacking cilia; petals obliquely narrowly ovate, acuminate, proximal inner edges hardly thickened, ciliate on upper margin, ca 1.2 cm \times ca 0.4 cm; labellum claw ca 1.5 mm long, lamina oblong, \pm flat, apex emarginate, basal cilia numerous, ca 0.3 mm long, marginal cilia 6–9 pairs, spreading, 1–1.5 mm long, central groove narrow; column slender, curved, 1–1.5 cm long, wings \pm rectangular, ca 3 mm long.

Granite areas around Stanthorpe in the Darling Downs district, in light open forest among rocks; common. Flowers spring.

31. *Pterostylis* sp. 3.

Slender plant up to 15 cm tall. Rosette radical, encircling base of scape, leaves 3–8, ovate to obovate, 1.5–2.5 cm \times 0.5–1.2 cm, usually senescent at flowering time. Flowers 1–5, usually semi-nodding, greenish brown or wholly reddish brown, pedicel including ovary 1.5–2.5 cm long, stem bracts 3–5 and subtending bracts narrowly ovate, closely sheathing, 1.5–2 cm \times ca 0.4 cm; dorsal sepal broad at base, ca 1.6 cm long, apex filiform, 2–3 mm long, lateral sepals deflexed, narrowly ovate, recurved sharply in basal quarter, concave, ending in outcurved point ca 3–4 mm long, upper margin of fused part lacking cilia; petals obliquely narrowly ovate, acuminate, proximal inner edges hardly thickened, ciliate on upper margin, ca 1 cm \times ca 0.4 cm; labellum claw ca 1.5 mm long, lamina narrowly elliptic, shallowly concave, apex entire, obtuse, basal cilia numerous, ca 0.3 mm long, marginal cilia 6–8 pairs, spreading, 1–1.5 mm long, central groove narrow; column slender, curved, 1–1.5 cm long, wings \pm rectangular, ca 3 mm long.

Recorded from Amiens and Glen Aplin in the Darling Downs district and near Gundiah in the Wide Bay district, in light open forest. Flowers spring.

Easily confused with *P. rufa* R. Br.

32. *Pterostylis* sp. 4.

Slender plant up to 35 cm tall. Rosette radical, encircling base of scape, leaves 6–9, ovate to oblong, 2.5–3.5 cm \times 1.2–1.5 cm, usually senescent at flowering. Flowers 3–10, obliquely erect, dark reddish brown, pedicel including ovary 1.3–1.5 cm long, stem bracts 4–7 and subtending bracts narrowly ovate, closely sheathing, 1.3–1.6 cm \times ca 0.3 cm, dorsal sepal broad at base, ca 2 cm long, apex filiform, ca 10 mm long, lateral sepals deflexed, broadly ovate, ending in fine tapered divergent points ca 1.2 cm long, upper margin glabrous; petals translucent, obliquely ovate, acuminate, proximal inner edges thickened but not touching at base of flower, ciliate along upper margin, ca 1.3 cm \times ca 0.5 cm, labellum claw ca 3 mm long, lamina ovate, margin slightly undulate, ca 5.5 mm \times ca 2.5 mm; basal cilia 5–7, ca 2 mm long, marginal cilia 4–6 pairs, spreading, 2–3 mm long, central groove broad, shallow; column slender, curved, 1–1.1 cm long, wings \pm rectangular, ca 3.5 mm long.

Recorded from southern parts of Moreton district, e.g. Clagiraba, Tamborine, Stradbroke I., in open forest. Flowers late spring.

27. *HABENARIA* Willd.

Deciduous terrestrial herbs; tuberosities obovoid to elongated. Leaves forming a radical rosette or scattered up the scape, entire. Inflorescences terminal racemes, subtending bracts often pointed; flowers usually white, sometimes yellow or greenish; perianth segments free, sometimes dorsal sepal and petals forming a loose galea; sepals usually broader than petals, often concave; labellum deeply 3-lobed, spurred; column erect; anther apical, 2-locular, auricles lateral, pollinia 2, sectile, each with a long, curved

caudicle and a terminal viscidium; rostellum erect; stigma of two separate narrow stigmaphores.

600 species, pantropical; 15 species Australia; 1 species south-eastern Queensland.

1. *Habenaria* sp. 1.

Slender erect herb *ca* 18 cm tall, glabrous. Leaves 2, basal, linear-ovate, apex bluntly acute, base \pm attenuate into sheath, 6–7 cm \times 0.4–0.5 cm. Stem bracts 1 or 2, sheathing, *ca* 7 cm \times *ca* 0.5 cm, pedicels 2 mm long, ovary linear, *ca* 7 mm long; subtending bracts \pm erect, acuminate, *ca* 7.5 mm \times *ca* 1.5 mm, folded; flowers white, not opening widely, *ca* 3.5 mm long; sepals *ca* 4 mm \times *ca* 2 mm, dorsal sepal ovate, cucullate, lateral sepals obliquely ovate, boat-shaped, obtuse; petals narrowly ovate, \pm incurved; labellum \pm elliptic, *ca* 3.5 mm \times *ca* 2 mm, spur *ca* 4 mm \times *ca* 1.5 mm, dilated towards apex, projecting back along ovary.

Recorded from Cooloola National Park in the Wide Bay district, on moist sandy soil. Flowers summer.

28. DIURIS Smith

Terrestrial glabrous herbs with small to medium-sized ovoid, obovoid or palmate tuberos. Leaves 1–several, basal, linear, lax or erect, flat, folded or spirally twisted. Flowers 1–several, reversed, in slender stiffly erect raceme; dorsal sepal broad, erect or projected forwards and cucullate at base then erect in distal half, lateral sepals linear, narrowly ovate or spatulate, longer than dorsal sepal, spreading or deflexed, parallel or crossed; petals ovate, elliptic or orbicular, longer than dorsal sepal, on slender stalks; labellum sessile, deeply 3-lobed, lateral lobes spreading or recurved, margin entire or irregular, midlobe projected forwards, contracted at base, often folded along centre line; disc with 1 or 2 raised longitudinal lines; column short, the parts scarcely united, winged from near base, anther 2-locular, pollinia 2, each deeply 2-lobed, attached to a viscidium, caudicle absent; stigma \pm cordate, sunken.

About 50 species Australia, 1 extending to Indonesia; 9 species south-eastern Queensland.

These orchids are extremely variable and hybrids can be common between sympatric species.

1. Lateral sepals at least twice as long as petals	.	.	.	.	.	.	.	.	.	2
Lateral sepals <i>ca</i> as long as petals, sometimes slightly longer or shorter	.	.	.	.	.	.	.	.	.	6
2. Flowers orange with purple markings	.	.	.	.	.	.	.	1.	<i>D. sheaffiana</i>	
Flowers cream, white, lilac, mauve or purple, never orange	.	.	.	.	.	.	.	.	.	3
3. Flowers white or cream	.	.	.	.	.	.	.	.	.	4
Flowers lilac, mauve or purple	.	.	.	.	.	.	.	.	.	5
4. Flowers white, <i>ca</i> 3 cm across; petals elliptic, contracted before claw	.	.	.	.	.	.	.	2.	<i>D. alba</i>	
Flowers cream with purple spots, <i>ca</i> 2 cm across; petals elliptic, tapered into basal claw	.	.	.	.	.	.	.	3.	<i>D. parvipetala</i>	
5. Flowers 4–6 cm across; petals ovate, contracting abruptly before claw	.	.	.	.	.	.	.	4.	<i>D. punctata</i>	
Flowers <i>ca</i> 2 cm across; petals cuneate, tapered into basal claw	.	.	.	.	.	.	.	3.	<i>D. parvipetala</i>	
6. Flowers orange-yellow; lateral sepals widely dilated towards apex	.	.	.	.	.	.	.	5.	<i>D. chrysantha</i>	
Flowers pale yellow to sulphur yellow; lateral sepals not widely dilated towards apex	.	.	.	.	.	.	.	.	.	7
7. Lateral lobes of labellum equal to or longer than midlobe	.	.	.	.	.	.	.	.	.	8
Lateral lobes of labellum much shorter than midlobe	.	.	.	.	.	.	.	.	.	9
8. Lateral lobes \pm ovate	.	.	.	.	.	.	.	6.	<i>D. maculata</i>	
Lateral lobes linear-oblong	.	.	.	.	.	.	.	7.	<i>D. platichila</i>	

9. Flowers \pm nodding; disc of callus with 2 clavate ridges 8. *D. abbreviata*
 Flowers not nodding; disc of callus with a single central ridge 9. *D. sulphurea*

1. *Diuris sheaffiana* Fitzg.

Diuris colemaniae Rupp; *D. tricolor* Fitzg.

Slender plant up to 45 cm tall with lobed tuberoids. Leaves 2, linear-ovate, 15–30 cm \times 0.3–0.5 cm. Flowers 2–6, orange with purple markings and suffusions, pedicel including ovary 3–4.5 cm long, subtending bracts 3–6 cm long; dorsal sepal ovate to obovate, projected forwards, 1–1.7 cm \times 0.6–0.8 cm, lateral sepals green, linear to linear-ovate, lax, acuminate, 3.5–5 cm \times 0.2–0.35 cm; petals elliptic, 0.7–1.4 cm \times 0.5–1 cm, with purple claws 5–7 mm long; labellum projected forwards, lateral lobes broadly oblong to ovate, obliquely erect, 3–4 mm \times 3–4 mm, distal margin irregularly crenulate, midlobe cuneate to ovate, flat or folded along midline, margin slightly irregular, 7–10 mm \times 8–10 mm, disc of 2 falcate spotted ridges *ca* 5 mm long, incurved near apex; column 4–5 mm long, wings narrowly deltoid, crenate, *ca* 4 mm long.

Widespread in Moreton and Darling Downs districts in eucalypt open forest. Flowers spring.

Variable in flower size and colouration. Forms with large flowers attractively marked with purple have been known as *D. tricolor* Fitzg.

2. *Diuris alba* R. Br.

WHITE DONKEY ORCHID

Diuris punctata Smith var. *alba* (R. Br.) Ewart & B. Rees

Slender plant up to 45 cm tall with lobed tuberoids. Leaves 2 or 3, linear to linear-ovate, 15–25 cm \times 0.3–0.5 cm. Flowers 2–6, white with lilac suffusions and spots, pedicel including ovary 2–2.5 cm long, subtending bracts 2.5–3.5 cm long; dorsal sepal narrowly ovate, projected obliquely forwards, 1.2–1.4 cm \times 0.7–0.8 cm, lateral sepals linear-ovate, lax, acuminate, 3–7 cm \times 0.2–0.4 cm; petals elliptic, 1.5–1.7 cm \times 0.7–0.8 cm, with claws *ca* 8 mm long; labellum projected forwards, lateral lobes narrowly ovate to oblong, *ca* 5 mm \times *ca* 1.5 mm, upper margin often enclosed by dorsal sepal, distal margin shallowly toothed, midlobe spade-shaped, flat, margin slightly irregular, *ca* 10 mm \times *ca* 8 mm, disc of two divergent ridges *ca* 5 mm long, the distal ends irregularly lobed; column *ca* 5 mm long, wings irregularly crenulate in upper third, *ca* 6 mm long. **Fig. 58E.**

Widespread in coastal communities of Wide Bay district and northern parts of Moreton district; often locally common in eucalypt forest and wallum. Flowers late winter–early spring.

Sporadic hybrids occur with *D. chrysantha* D. Jones & M. Clements

3. *Diuris parvipetala* (Dockr.) D. Jones & M. Clements

Diuris punctata Smith var. *parvipetala* Dockr.

Slender plant up to 40 cm tall with lobed tuberoids. Leaves 2, linear, 15–25 cm \times 0.3–0.5 cm. Flowers 1–5, cream with mauve spots and blotches, pedicels including ovary 2.5–3.5 cm long, subtending bracts 3–4 cm long; dorsal sepal narrowly ovate, obliquely erect, 8–10 mm \times 5–8 mm, lateral sepals linear, stiffly deflexed, acute to acuminate, 4–6 cm \times 0.2–0.25 cm; petals cuneate, 6–8 mm \times 3–5 mm, tapering to a basal claw *ca* 5 mm long; labellum obliquely deflexed, lateral lobes linear-oblong, obliquely erect, 2–3 mm \times 1–1.5 mm, midlobe cuneate, flat or folded along the midline, margin slightly irregular, 7–8 mm \times 4–5 mm, disc of 2 raised, falcate ridges 3–4 mm long; column *ca* 3 mm long, wings *ca* 3 mm long.

Recorded from Darling Downs and Burnett districts, growing among grass in open forest. Flowers spring.

4. *Diuris punctata* Smith

PURPLE DONKEY ORCHID

Diuris elongata Swartz; *D. lilacina* F. Muell.; *D. dendrobioides* Fitzg.

Slender plant up to 60 cm tall with lobed to palmate tuberoids. Leaves 2, linear-ovate, 15–30 cm \times 0.4–0.8 cm. Flowers 2–10, mauve, purple or lilac, often with lighter coloured suffusions, rarely spotted, pedicel including ovary 3–4.5 cm long, subtending bracts 3–4.5 cm long; dorsal sepal ovate, obliquely erect to erect, margin often recurved, 1.2–2.2 cm \times 1–1.5 cm, lateral sepals linear to linear-ovate, obliquely deflexed, acuminate, 4–8 cm \times 0.2–0.4 cm; petals ovate, 1.2–1.7 cm \times 0.9–1.3 cm, with claws *ca*

8 mm long; labellum obliquely deflexed, lateral lobes oblong to ovate, obliquely erect, distal margin irregularly toothed, *ca* 4–6 mm \times 2.5–5 mm, midlobe ovate, flat or folded along midline, margin slightly undulate, 1.1–1.5 cm \times 1.1–1.4 cm, disc of 2 raised falcate ridges 6–8 mm long; column 4–6 mm long, wings \pm narrowly ovate, anterior margin yellow and irregularly crisped, 4–6 mm long.

Granite areas around Stanthorpe in the Darling Downs district, often growing in colonies. Flowers late spring–summer.

A small flowered form having pale-coloured flowers occurs in some localities.

5. *Diuris chrysantha* D. Jones & M. Clements

Diuris aurea auct. Qld non Smith

Slender plant up to 32 cm tall with obovoid or bifid tuberoids. Leaves 1 or 2, linear, subulate, 12–36 cm \times 0.4–0.8 cm. Flowers 2–7, golden yellow to orange with brown markings on dorsal sepal and labellum, pedicel including ovary 3–4.5 cm long, subtending bracts 2.5–3.5 cm long; dorsal sepal ovate, erect in distal half with 2 dark blotches prominent in centre, 7–9 mm \times 6–7 mm, lateral sepals green and brown, linear-spathulate, parallel or crossed, tips often curved forwards, 1.2–1.8 cm \times 0.2–0.4 cm; petals orbicular to obcordate, 6–8 mm \times 6–8 mm, with dark claws 4–7 mm long; labellum obliquely deflexed, lateral lobes narrowly ovate to obovate, erect, 2.5–4 mm \times 2.5–3 mm, midlobe cordate to reniform, usually folded along midline, 4–6 mm \times 6.5–8 mm, disc of 2 narrow incurved ridges *ca* 4 mm long; column *ca* 4 mm long, wings linear, irregularly crenate, *ca* 4 mm long.

Widespread in Moreton, Darling Downs and Wide Bay districts, in open eucalypt forest and coastal wallum; common. Flowers late spring–summer.

Sporadic hybrids occur with *D. alba* R. Br.

6. *Diuris maculata* Smith

LEOPARD ORCHID

Diuris curvifolia Lindl.

Slender plant up to 40 cm tall with ovoid tuberoids. Leaves 2 or 3, linear-ovate, 15–25 cm \times 0.3–0.5 cm. Flowers 2–8, pale yellow, heavily blotched and suffused with dark brown, especially on outside of segments, pedicel including ovary 3–4 cm long, subtending bracts *ca* 2.5 cm long; dorsal sepal ovate, erect or recurved in upper half, 1–1.2 cm \times 0.7–0.9 cm, lateral sepals brown with green towards apex, falcate, usually crossed and reflexed beneath ovary, 1.2–1.5 cm \times 0.2–0.3 cm; petals orbicular, 7–10 mm \times 7–10 mm, on dark claws 7–10 mm long; labellum projected forwards, lateral lobes oblong, *ca* 6 mm \times *ca* 3 mm, widely spreading or recurved, distal margin crenulate, midlobe cuneate, strongly folded along midline, *ca* 5 mm \times *ca* 6 mm, disc of 2 sickle-shaped ridges *ca* 4 mm long; column *ca* 3.5 mm long, wings irregularly lobed near apex, 3 mm long.

Recorded from Stanthorpe and Toowoomba areas in Darling Downs district, in open forest. Flowers spring.

7. *Diuris platichila* Fitzg.

Diuris citrina Nicholls; *D. curtifolia* Rupp; *D. cuneilabris* Rupp; *D. cucullata* Rupp; *D. lineata* Messmer

Slender plant up to 60 cm tall with obovoid tuberoids. Leaves 2, linear, 20–40 cm \times 0.3–0.4 cm. Flowers 2–7, yellow with brown spots and blotches, pedicel including ovary *ca* 3 cm long, subtending bracts *ca* 2.5 cm long; dorsal sepal ovate, bent abruptly in upper half, 1.2–1.5 cm \times 1–1.2 cm, lateral sepals very narrowly ovate, falcate, parallel or slightly crossed, 1.3–1.6 cm \times 0.3–0.4 cm; petals oblong-elliptic, 1.2–1.5 cm \times 0.7–0.9 cm, with dark claws *ca* 6 mm long; labellum obliquely deflexed, lateral lobes linear-oblong, widely spreading, *ca* 8 mm \times *ca* 2.5 mm, distal margin crenulate, midlobe cuneate, slightly folded along midline but usually flat, margin entire, *ca* 7 mm \times *ca* 8 mm, disc of 2 broad incurved ridges *ca* 4 mm long; column *ca* 4 mm long, wings irregularly lobed at apex, *ca* 4 mm long.

Recorded from near Stanthorpe and Toowoomba in the Darling Downs district, in open eucalypt forest. Flowers spring.

This taxon is of uncertain status and is under investigation.

8. *Diuris abbreviata* F. Muell. ex Benth.

Slender plant up to 50 cm tall with obovoid tuberoids. Leaves 2 or 3, linear-ovate, 15–35 cm \times 0.5–0.7 cm. Flowers 3–9, usually \pm nodding, clear yellow with brown blotches on labellum and dorsal sepal, pedicel including ovary 4–6.5 cm long, subtending bracts *ca* 5 cm long; dorsal sepal ovate, bent abruptly in lower third, distal margin crenulate, 1–1.2 cm \times 0.9–1 cm; lateral sepals linear-ovate, \pm falcate, parallel or crossed, 1.5–1.8 cm \times 0.3–0.4 cm; petals ovate to elliptic, 1.2–1.4 cm \times 0.8–0.9 cm, on claws *ca* 7 mm long; labellum obliquely deflexed, lateral lobes oblong, curved within dorsal sepal, distal margin irregularly lobed, *ca* 4 mm \times *ca* 1.5 mm, midlobe broadly ovate, folded along midline, margin \pm undulate, *ca* 8 mm \times *ca* 10 mm, disc of 2 clavate slightly incurved ridges *ca* 5.5 mm long; column *ca* 3.5 mm long, wings irregularly crenulate, *ca* 3 mm long.

Recorded from the Stanthorpe area of the Darling Downs district, on gravelly soils in open forest. Flowers spring.

9. *Diuris sulphurea* R. Br.

Diuris oculata F. Muell. ex Lindl.; *D. latifolia* Rupp

Slender plant up to 60 cm tall with elongate to obovoid tuberoids. Leaves 1–3, linear-ovate to narrowly ovate, 15–30 cm \times 0.3–0.9 cm. Flowers 1–7, pale yellow with brown blotches on dorsal sepal and labellum, pedicel including ovary 3–5 cm long, subtending bracts 2.5–4 cm long; dorsal sepal ovate, projected forwards, 2 basal blotches prominent, 1.5–2 cm \times 0.8–1 cm, lateral sepals linear, lax, parallel, 1.7–2 cm \times 0.2–0.3 cm; petals ovate, 1.2–1.5 cm \times 0.7–0.8 cm, with very dark claws up to 7 mm long; labellum obliquely deflexed, narrowly rhombic, strongly folded along midline, apex often emarginate, 0.8–1.1 cm \times 0.7–0.9 cm, lateral lobes asymmetrically ovate, spreading or recurved, 4–6 mm \times 3–5 mm, disc of single broad ridge *ca* 5 mm long; column 4–5 mm long, almost as broad as long, wings tapering from halfway to a slender blunt apex, *ca* 4 mm long.

Moreton district, Conondale Ra. in southernmost Wide Bay district, and Darling Downs district, in eucalypt open forest. Flowers spring.

29. LYPERANTHUS R. Br.

Terrestrial herbs with ovoid underground tuberoids. Scapes either with 1 radical leaf and 2 or 3 almost leaf-like empty bracts or with 2 stem leaves, bracts usually large and leaf-like. Flowers 2 or more per scape; dorsal sepal broad, concave, erect or incurved over column, lateral sepals and petals narrow, all \pm equal; labellum shorter than sepals, with broad erect claws sometimes dilated upwards into small erect lateral lobes, midlobe ovate or narrowly so, recurved, disc between lateral lobes longitudinally thickened in centre, surface of midlobe papillose; column erect or incurved, not winged; anther terminal, erect, 2-locular, pollinia granular.

8 species Australia, New Caledonia, New Zealand; 4 species Australia; 1 species south-eastern Queensland.

1. *Lyperanthus suaveolens* R. Br.

BROWN BEAKS

Caladenia sulphurea Cunn.; *Leptoceras sulphureum* (Cunn.) Lindl.; *C. suaveolens* (R. Br.) H. G. Reichb.

Glabrous herb up to 50 cm tall. Leaf linear to linear-elliptic, acute, margin incurved, slightly shorter to slightly longer than scape, 0.5–1.2 cm wide. Scape with 2 or 3 sheathing acute-acuminate bracts 3–4 cm long, raceme extended, pedicel including ovary 1–3 cm long, subtended by narrowly ovate acuminate bract 2–3 cm long; flowers dark reddish to brownish, or sometimes greenish yellow, sometimes fragrant; dorsal sepal cucullate over column, acuminate, tip sometimes recurved, 2–2.7 cm \times 0.5–0.7 cm, lateral sepals and petals linear, spreading or recurved, acute, 2.2–2.8 cm \times 0.2–0.3 cm; labellum claw erect with entire incurved margin, lateral lobes not prominent, rounded, 2 rows of calli along claw and between lateral lobes, midlobe oblong, obtuse, recurved,



Fig. 58 ORCHIDACEAE — **A** *Corybas aconitiflorus*, habit $\times 1\frac{1}{2}$; **B–D** *Pterostylis* spp. — **B** *P.* sp. 1., part inflorescence $\times 1\frac{1}{2}$; **C** *P. nutans* var. *nutans*, flower $\times 1$; **D** *P. longifolia*, habit $\times 1$; **E** *Diuris alba*, flower $\times 1\frac{1}{2}$; **F** *Spiranthes sinensis*, part inflorescence $\times 1\frac{1}{2}$.

covered throughout with papillae-like glands \pm arranged in several rows; column erect, incurved, 0.9–1.2 cm long, winged. Capsules obovoid, *ca* 1.5 cm long. **Fig. 59A.**

Coastal districts in swampy or heathy understorey under open forest, also in the Stanthorpe-Wallangarra area of the Darling Downs district. Flowers late winter–spring.

30. CHILOGLOTTIS R. Br.

Terrestrial glabrous herbs with small ovoid tuberoids. Leaves 2, radical, opposite, ground hugging or semi-erect. Flowers solitary, reversed, erect, dull coloured, pedicel elongating to 20 cm or more prior to seed dispersal; dorsal sepal narrow, erect and incurved, lateral sepals linear, decurved, with apical clubs, free or connate at base; petals spreading or reflexed; labellum hinged on short basal claw, lamina undivided, narrowed at base, upper surface bearing shiny calli often in an insect-like arrangement; column incurved, slender, prominently winged; anther 2-locular, erect, pollinia 4, clavate; stigma sunken.

About 15 species, all Australian, 3 extending to New Zealand; *ca* 8 species south-eastern Queensland.

- | | | |
|---|--------------------------------------|---|
| 1. Labellum apex truncate | 1. <i>C. truncata</i> | 2 |
| Labellum apex acute to obtuse, never truncate | | |
| 2. Labellum with lamina callus consisting of a densely packed cluster of shiny glands at distal end of narrow part of lamina | 2. <i>C. trapeziformis</i> | 3 |
| Labellum with lamina callus occupying most of central basal portion of lamina | | |
| 3. Sepal clubs red | 3. <i>C. sp. 1.</i> | 4 |
| Sepal clubs green, yellowish or cream | | |
| 4. Sepal clubs 1–2 mm long | | 5 |
| Sepal clubs 3 mm or more long | | 6 |
| 5. Labellum with lamina callus occupying a narrow central band of upper lamina | 4. <i>C. sp. 2.</i> | |
| Labellum with lamina callus occupying most of upper surface of lamina | 5. <i>C. formicifera</i> | |
| 6. Labellum with main stalked gland of callus undivided; lateral sepals widely divergent, sepal clubs 3–4 mm long | 6. <i>C. sylvestris</i> | 7 |
| Labellum with main stalked gland of callus emarginate; lateral sepals \pm parallel, sepal clubs 7–10 mm long | | |
| 7. Labellum light reddish, 7–8 mm long, distal part of lamina rugose; sepal clubs 7–8 mm long | 7. <i>C. sp. 3.</i> | |
| Labellum dark reddish green, 9–10 mm long, distal part of lamina with numerous sessile green calli embedded in red tissue; sepal clubs 9–10 mm long | 8. <i>C. sp. 4.</i> | |

1. *Chiloglottis truncata* D. Jones & M. Clements

Slender herb up to 12 cm tall. Leaves narrowly elliptic, margin undulate, 5–6 cm \times 1.4–1.6 cm, dark green above, lighter beneath. Flower solitary, green to pinkish green, *ca* 1.6 cm long, pedicel including ovary *ca* 3 cm long, subtending bract narrowly ovate, closely sheathing, 1.2–1.3 cm long; dorsal sepal erect, narrow in basal half then gradually dilated before narrowing into short blunt apex, 1–1.1 cm \times 0.2–0.25 cm, lateral sepals linear, decurved, connate at base, 9–10 mm \times *ca* 0.8 mm, club-like apices yellowish, 0.8–1 mm long; petals unequally ovate, reflexed against ovary, 7.5–8 mm \times 2–2.5 mm; labellum claw *ca* 1 mm long, lamina spatulate to cuneate, narrow in basal 3 mm then gradually expanded, lateral margin level with obtuse apex to appear truncate, 7.5–8 mm \times 4–4.5 mm, lamina callus black, shiny, occupying most of upper surface of lamina, major stalked gland *ca* 2.3 mm long, apex emarginate, *ca* 1.5 mm across, on distal side a cluster of shiny black sessile glands *ca* 1.2 mm across and a large flat \pm rounded gland *ca* 1 mm across, distally a series of sessile black glands extend in a central band to apex, a few stalked reddish clavate glands up to 0.8 mm long flanking main gland, basal glands

absent; column green with a few red spots, curved, 7–8 mm long, wings narrow, higher than anther.

Recorded from Darling Downs district in eucalypt open forest, e.g. Toowoomba, Goombungee, Anduramba areas. Flowers spring.

This species has previously been confused in Queensland with *C. formicifera* Fitzg.

2. *Chiloglottis trapeziformis* Fitzg.

BROAD LIPPED BIRD ORCHID

Slender herb up to 12 cm tall. Leaves elliptic, margin entire to irregularly crisped, 2.5–5 cm × 1.2–2 cm, dark green above, lighter beneath. Flower solitary, brownish pink, *ca* 2 cm long, pedicel including ovary 3–4.5 cm long, subtending bract narrowly ovate, closely sheathing, 1–1.5 cm long; dorsal sepal curved, narrow in basal half then gradually dilated before narrowing into short blunt apex, 1–1.2 cm × 0.2–0.3 cm, lateral sepals linear, connate at base, 0.9–1.1 cm × 0.1–0.15 cm, club-like apices *ca* 1 mm long; petals unequally ovate, ± falcate, reflexed against ovary, 9–10 mm × *ca* 2.5 mm; labellum claw *ca* 1 mm long, lamina broadly rhombic, narrow in basal 5 mm, anterior margin slightly recurved, 7–8.5 mm × 6–7 mm, lamina callus a densely packed cluster of shiny black glands situated at distal end of narrow part of lamina, major stalked gland black, *ca* 2.5 mm long, apex *ca* 2 mm across; column green with fine red dots, curved, 8–9 mm long, wings narrow, tips level with anther.

Recorded from the Stanthorpe area of the Darling Downs district, in eucalypt open forest. Flowers spring.

3. *Chiloglottis* sp. 1.

Slender herb up to 8 cm tall. Leaves elliptic, margin entire to irregularly crisped, 2.5–4 cm × 1.2–1.8 cm, dark green or yellow-green above, lighter beneath. Flower solitary, green, *ca* 1.7 cm long, pedicel including ovary *ca* 1 cm long, subtending bract narrowly ovate, closely sheathing, *ca* 1.3 cm long; dorsal sepal curved, narrow in basal half then gradually dilated, before narrowing suddenly into attenuate apex *ca* 2 mm long, 9–10 mm × 2.5–3 mm, lateral sepals linear, connate at base, 9–10 mm × *ca* 1 mm, club-like apices red, tapered, *ca* 5 mm long; labellum claw *ca* 1 mm long, lamina green, obovate to rhombic, narrow in basal 3 mm then gradually expanded, apex pinkish, obtuse, anterior margin rounded, slightly irregular, 7–7.5 mm × 4.5–5 mm, lamina callus red and green, shiny, congested, occupying most of upper surface of lamina, major stalked gland clavate, recurved, *ca* 1.5 mm long, stalk green, apex black and shiny, on distal side a few shiny red clavate glands then a mass of irregular low green calli embedded in red tissue extending nearly to apex, lateral to main structure numerous red clavate glands on thin stalks; column greenish, curved, 5–6 mm long, wings fairly broad, tips level with anther.

Recorded from Mt French and Mt Maroon in the Moreton district, in light open forest. Flowers winter.

4. *Chiloglottis* sp. 2.

Slender herb up to 6 cm tall. Leaves elliptic, margin entire to irregularly crisped, 3–5 cm × 1.5–2 cm, dark green above, lighter beneath. Flowers solitary, reddish pink, *ca* 2 cm long, pedicel including ovary *ca* 1.2 cm long, subtending bract narrowly ovate, acuminate, closely sheathing, *ca* 1.3 cm long; dorsal sepal curved, very narrow in basal half, then dilated before narrowing into attenuate apex *ca* 1 mm long, 9–10 mm × *ca* 2 mm, lateral sepals linear, curved, connate at base, 9–10 mm × *ca* 0.7 mm, club-like apices greenish cream, *ca* 2 mm long; labellum claw *ca* 1 mm long, lamina greenish pink, spatulate-rhombic, narrow in basal 3 mm then suddenly expanded, anterior margin sharply rounded, apex glandular; lamina callus reddish green, shiny, occupying a narrow central band of upper surface of lamina, major stalked gland green and red, entire, curved, *ca* 1 mm long, on distal side a large shiny red gland *ca* 1 mm across then a cluster of red clavate glands, then a sessile black gland *ca* 1 mm across, then a clear rugose band extending to apex, lateral to main structure a small cluster of red clavate glands; column greenish with scattered red spots, curved, 5–6 mm long, wings very narrow, tips level with anther.

Recorded from Stradbroke I. on sandy soils under light coastal forest. Flowers winter.

5. *Chiloglottis formicifera* Fitzg.

Slender herb up to 10 cm tall. Leaves elliptic, margin undulate to crisped, 4–6 cm \times 1.2–1.5 cm, dark green above, lighter beneath. Flowers solitary, greenish pink, *ca* 2 cm long, pedicel including ovary 3–4 cm long, subtending bract narrowly ovate, closely sheathing, 1–1.5 cm long; dorsal sepal curved, narrow in basal half then gradually dilated before narrowing into short blunt apex, 1–1.2 cm \times 0.2–0.3 cm, lateral sepals linear, connate at base, 1–1.2 cm \times 0.1–0.5 cm, club-like apices green, *ca* 1 mm long; petals unequally ovate, \pm falcate, reflexed against ovary, 8–9 mm \times 2–2.5 mm; labellum claw *ca* 1 mm long, lamina broadly rhombic, narrow in basal 4 mm, anterior margin entire, apex recurved, obtuse, 9–9.5 mm \times 6–6.5 mm, lamina callus occupying most of ventral surface of lamina, major stalked gland black, broadly emarginate, *ca* 2 mm long, apex *ca* 2 mm across, on distal side a large shiny black sessile gland *ca* 1 mm across then a conspicuous group of red and black sessile calli extending to apex, lateral to main structure numerous black or reddish clavate glands on thin stalks; column green, curved, 8–9 mm long, wings narrow, tips level with anther.

Recorded from Mt Norman in open forest near streams. Flowers spring.

6. *Chiloglottis sylvestris* D. Jones & M. Clements

Slender herb up to 10 cm tall. Leaves elliptic, margin entire to irregularly crisped, 3–6 cm \times 1.2–2 cm, dark green above, lighter beneath. Flower solitary, greenish pink, *ca* 2 cm long, pedicel including ovary *ca* 1.5 cm long, subtending bract narrowly ovate, closely sheathing, 1.2–1.5 cm long; dorsal sepal curved, narrow in basal half then abruptly dilated before narrowing into attenuate apex, 1–1.3 cm \times 0.2–0.25 cm, lateral sepals filiform, decurved, connate at base, 1–1.4 cm \times *ca* 0.04 cm, club-like apices yellowish, 3–4 mm long; petals obliquely narrowly ovate, reflexed against ovary, 7–10 mm \times 2–2.3 mm; labellum claw *ca* 1 mm long, lamina obovate to rhombic, narrow in basal 4 mm, anterior margin slightly recurved, distal margin \pm entire, 7–8 mm \times 4–4.5 mm, lamina callus reddish black, ant-shaped, occupying most of central basal portion of lamina, major stalked gland greenish, *ca* 1.5 mm long, undivided, on proximal side a prominent group of sessile glands *ca* 3 mm \times *ca* 1.5 mm, on both sides of this a series of circular sessile glands mixed with stalked reddish clavate glands *ca* 1 mm long, a pair of short thick glands at labellum base; column greenish white with red spots, curved, 6–8 mm long, wings narrow, tips level with anther.

Recorded from Moreton district in tall open forest, rainforest margins and rainforests, e.g. Springbrook, Lamington Plateau, Cunninghams Gap, Brisbane Forest Park. Flowers summer–autumn.

7. *Chiloglottis* sp. 3.

Slender herb up to 10 cm tall. Leaves elliptic, margin entire to irregularly crisped, 2.5–4.5 cm \times 1.2–2 cm, dark green above, lighter beneath. Flower solitary, greenish pink, *ca* 1.6 cm long, pedicel including ovary *ca* 1.2 cm long, subtending bract narrowly ovate, closely sheathing, *ca* 1.2 cm long; dorsal sepal curved, narrow in basal half then gradually dilated before narrowing into attenuate apex *ca* 3 mm long, 1–1.3 cm \times 0.25–0.3 cm, lateral sepals linear, connate at base, 1.2–1.4 cm \times *ca* 0.1 cm, club-like apices yellow, prominent, 7–8 mm long; labellum claw *ca* 1 mm long, lamina reddish, spatulate to rhombic, narrow in basal 3 mm then suddenly expanded, apex mucronate to shortly caudate, anterior margin rounded, slightly recurved, 7–8 mm \times 4.5–5 mm, lamina callus greenish black to black, shiny, occupying most of upper surface of lamina, major stalked gland abruptly bent near apex, slightly emarginate, *ca* 1.5 mm long, on distal side a few scattered sessile calli, then a large flat sessile gland 1–1.5 mm across, then a pinkish rugose area extending nearly to apex, lateral to main structure a dense mass of short, pink to red clavate glands; column greenish sometimes with red spots, curved, 5–6 mm long, wings fairly broad, tips level with anther.

Recorded from Canungra, Redbank Plains and Helidon areas in the Moreton district, in tall open forest and open forest. Flowers winter.

8. *Chiloglottis* sp. 4.

Slender herb up to 16 cm tall. Leaves elliptic, margin entire to irregularly crisped, 3–5 cm

× 1.8–2.2 cm, dark green above, lighter beneath. Flower solitary, dark greenish to reddish, *ca* 2.2 cm long, pedicel including ovary *ca* 2.7 cm long, subtending bract narrowly ovate, acuminate, closely sheathing, *ca* 1.5 cm long; dorsal sepal curved, narrow in basal half then suddenly dilated before suddenly narrowing into attenuate apex *ca* 5 mm long, 1.2–1.4 cm × 0.3–0.4 cm long, lateral sepals linear, connate at base, 1.5–1.7 cm × *ca* 0.1 cm, club-like apices greenish yellow, prominent, 9–10 mm long; labellum claw *ca* 1 mm long, lamina dark reddish green, broadly spatulate to rhombic, narrow in basal 3–4 mm, gradually expanding, apex obtuse, anterior margin rounded, slightly irregular, 9–10 mm × 5.5–6.5 mm, lamina callus greenish black, shiny, occupying nearly all upper surface of lamina, major stalked gland greenish black, clavate, recurved, slightly emarginate, *ca* 3 mm long, on distal side a cluster of sessile green glands, then a large flat greenish black sessile gland *ca* 1.5 mm across, then a mass of irregular low green calli embedded in red tissue extending nearly to apex, lateral to main structure a dense mass of long dark red clavate glands; column greenish with red spots, curved, 6–8 mm long, wings broad, tips higher than anther.

Recorded from Canungra area in the Moreton district, in tall open forest. Flowers winter.

***Chiloglottis reflexa* (Labill.) Druce** has long been recorded from Queensland but recent studies have shown it is confined to southern Australia.

31. SPIRANTHES Rich.

Terrestrial herbs with elongated underground tubers. Flowers small, sessile in a spiral spike. Leaves several, basal, narrow or linear. Perianth segments subequal; dorsal sepal erect or incurved over column, ovate, concave, lateral sepals free, erect or spreading; petals truncate, erect, forming a loose galea with dorsal sepal; labellum *ca* as long as sepals, on very short claw, undivided, lower half erect with margin embracing column, disc with two rounded glands at base; column erect, very short, contracted in the lower half, column wings membranous, stretching between anther filament and stigmatic plate, adherent to latter, anther ± blunt, pollinia in 2 pairs; rostellum short, bifid; stigmatic surface large.

25 species cosmopolitan, except Central and tropical South America, tropical and South Africa and the Mascarenes; 1 species Australia, occurring in south-eastern Queensland.

1. *Spiranthes sinensis* (Pers.) Ames

LADIES' TRESSES

Neottia australis R. Br.; *Spiranthes australis* (R. Br.) Lindl.; *S. novae-zelandiae* J. D. Hook; *S. sinensis* subsp. *australis* (R.Br.) Kitam.

Slender erect herb 10–45 cm tall, rarely more, glabrous below inflorescence. Leaves 3–5, basal, linear to very narrowly obovate, apex acute, base attenuate into sheath, 4–16 cm × 0.2–1 cm, glabrous. Stem bracts 3–5, sheathing, decreasing in size upwards; rachis glandular pubescent, ovary glandular pubescent, *ca* 3 mm long; flowers pink with white labellum or wholly white, fragrant; perianth segments ± oblong-ovate to oblong-obovate, blunt, 4–5 mm long; labellum white, ± rectangular, lower half bulging basally, apex truncate, margin fimbriate or glandular-dentate, with a large ovoid gland on each side of base of disc, 4–5 mm long; column fleshy, *ca* 3 mm long. **Fig. 58F.**

Recorded from most districts of the region in moist drainage lines or poorly drained areas on heavy soils. Colonises lawns, gardens and pasture often at high elevations. Flowers spring to autumn.

32. ACIANTHUS R. Br.

Small deciduous terrestrial herbs arising from small ± round tuberoid. Leaf solitary, ± cordate. Flowers in terminal racemes, pedicels short; sepals with filiform apical segment, dorsal sepal ± erect or cucullate, lateral sepals narrow; petals shorter than sepals; labellum sessile, ± entire with 2 basal calli, usually broader than other segments and usually decurved in part; column ± without foot, ± terete, bent forwards in apical half,

rarely winged; anther terminal, erect, 2-locular, pollinia granular, 4 in 2 pairs; rostellum of $2 \pm$ triangular discs on top of stigma.

20 species Australia, New Zealand, Solomon Is, New Caledonia; 9 species Australia; 6 species south-eastern Queensland.

- | | | |
|--|----------------------------|---|
| 1. All perianth segments less than 5 mm long | 1. <i>A. amplexicaulis</i> | 2 |
| Dorsal sepal 5 mm or more long | | |
| 2. Dorsal sepal with filiform point more than 10 mm long | 2. <i>A. caudatus</i> | 3 |
| Dorsal sepal with point less than 4 mm long | | |
| 3. Dorsal sepal broadly ovate, usually covering column | | 4 |
| Dorsal sepal narrowly ovate, not covering column | | 5 |
| 4. Dorsal sepal with short, depressed mucro; labellum margins incurved | 3. <i>A. ledwardii</i> | |
| Dorsal sepal with projecting point 2-3 mm long; labellum margins recurved | 4. <i>A. fornicatus</i> | |
| 5. Sepals 5-6.5 mm long; labellum 3.5-4.5 mm \times 2-3.5 mm, usually uniformly dark coloured | 5. <i>A. sp. 1.</i> | |
| Sepals 7-8 mm long; labellum 6-7 mm \times 3-4 mm, greenish yellow with dark central band and dark margins | 6. <i>A. exsertus</i> | |

1. *Acianthus amplexicaulis* (F. M. Bailey) Rolfe

Microstylis amplexicaulis F. M. Bailey; *Listera amplexicaulis* (F. M. Bailey) F. M. Bailey

Terrestrial or sometimes growing in decaying moss or fern debris or leaf mould on trees or rocks; stems 5-13.5 cm long, very slender and delicate. Leaf usually high on stem, \pm ovate to broadly ovate in outline, apex acute, base cordate, margin entire or, usually, variously lobed or crenulate, 1-3 cm \times 1-2.2 cm, glabrous. Flowers 2-*ca* 10, distant, pedicels including ovary 3-6 mm long, subtended by cordate acute bract 2-7 mm long; flowers pale green; dorsal sepal linear, \pm erect, 3-4 mm long, lateral sepals linear, 2.5-4 mm long; petals linear, 2-3.5 mm long; labellum rhombic or sometimes cuneate or ovate, \pm flat and decurved at *ca* middle, apex apiculate, front margin crenulate to deeply dentate, 2.5-3 mm long, disc with 2 longitudinal ridges, basal calli often not readily discernible; column *ca* 1.5 mm long; anther burgundy coloured. Capsules ellipsoid, 5-7 mm long.

Coastal districts, in or near rainforest or in littoral rainforest; rarely collected. Flowers autumn-winter.

2. *Acianthus caudatus* R. Br.

MAYFLY ORCHID

Slender glabrous herb up to 22 cm tall. Leaf at or near base, broadly ovate, shortly acuminate, base cordate to stem-clasping, margin entire to crenulate, 1-4 cm \times 1-3.5 cm, purplish below, reticulate veined. Flowers 1-9, pedicels including ovary 5-10 mm long, subtended by acuminate bract 3-6 mm long; flowers purplish, scented; dorsal sepal \pm inflexed, dilated and concave over anther, tapering to filiform point 2-3.5 cm long, expanded part 7-10 mm long, lateral sepals linear, tapering into filiform point, whole 1.2-3 cm long; petals \pm ovate, *ca* 4-6 mm long; labellum crimson or purplish, sessile, base erect, embracing column, thereafter ovate, acute, abruptly recurved near tip, margin entire, surface glandular but \pm smooth, with 2 triangular calli 3-6 mm long at base; column inflexed, very slender but dilated apically, very narrowly winged below, 3-4.5 mm long.

Possibly occurring in southernmost parts of Moreton district. Flowers winter-spring.

3. *Acianthus ledwardii* Rupp

Slender herb *ca* 5 cm tall. Leaf \pm basal, broadly ovate, apex acuminate or mucronate, base cordate, margin entire, *ca* 2.7 cm \times *ca* 1.8 cm, pale green above. Flowers 2-6, somewhat nodding, greenish pink with darker labellum; dorsal sepal ovate, cucullate, mucronate, the point depressed, lateral sepals linear, projected forwards, parallel, abruptly contracted at trifid apex, apical point 1-2 mm long, whole *ca* 6 mm long; petals narrowly ovate, spreading, acute, *ca* 3 mm long; labellum ovate, projected forwards,

convex below, with 2 basal smooth comma-like callosities, apex obtuse, margin incurved, serrulate, basal part smooth, distal part papillate; column basally dilated, incurved, not winged. Capsules not seen.

Recorded only from Burleigh Heads in southern Moreton district and last collected in 1938. Flowers winter.

This taxon is very closely related to *A. fornicatus* and its specific rank is questionable.

4. *Acianthus fornicatus* R. Br.

PIXIE CAPS

Acianthus brunonis F. Muell.

Slender herb up to 35 cm tall, either dull red-brown or green. Leaf basal or below middle, broadly ovate or occasionally ovate, mucronate, base cordate to stem-clasping, margin entire or somewhat 3-lobed or sinuate, 1.2–5.5 cm × 1.2–3.5 cm, dull green above, reddish or purplish below. Flowers 1–14, pedicels including ovary 4–10 mm long, subtended by acuminate bract 3–5 mm long; flowers green to light reddish brown; dorsal sepal often ± cucullate over column, broadly ovate, point filiform, 2–3 mm long, whole 0.6–1.2 cm long, lateral sepals linear, projected forwards or decurved, ± parallel or partly connate, usually abruptly contracted at apex with filiform point 1–2 mm long, apex also dentate, whole 6–9.5 mm long; petals narrowly ovate to ovate, acute, spreading, ca 2.5–3.5 mm long; labellum oblong or oblong-ovate, projected forwards but apex decurved, acuminate, concave basally with 2 prominent basal plate-like calli, margin deeply decurved, sometimes serrate, basal half smooth, distal half prominently papillose, thickened, central band reddish; column semiterete, basally dilated, incurved, not winged, 3–4 mm long. Capsules ellipsoid to narrowly obovoid, ca 8–10 mm long, papillate. **Fig. 59B.**

Coastal districts in moist gullies or sheltered areas. Flowers winter.

5. *Acianthus* sp. 1.

Slender herb up to 20 cm tall. Leaf ± basal, broadly ovate to cordate, mucronate, acuminate, margin entire, sinuous or sometimes somewhat lobed, 1.4–4.5 cm × 1.2–3.5 cm, dark green above, purplish beneath, venation reticulate, conspicuous. Flowers 3–20, pedicels including ovary 4–6 mm long, subtended by broad acuminate bract 3–5 mm long; flowers reddish or purplish or sometimes bright green; dorsal sepal narrowly ovate-obovate, concave, incurved, apical point filiform, 1–2 mm long, base contracted, 5–6.5 mm × 2–3 mm, lateral sepals linear, subulate, ± parallel or spreading with diverging apices, apical point 2–3 mm long, base 5–6 mm long; petals ovate, acute, spreading or reflexed, 2–4 mm long; labellum on short contracted claw, ovate to oblong-ovate, 3.5–4.5 mm × 2–3.5 mm, concave towards base with 2 large smooth comma-like callosities, apex acute-acuminate, thickened, smooth or minutely glandular, front margin depressed; column semiterete, exserted, incurved, not winged, 2.5–3.5 mm long. Capsules ellipsoid, ca 6–8 mm long.

Recorded from Lamington National Park in the Moreton district, among low shrubs along the margins of escarpments. Flowers autumn–winter.

6. *Acianthus exertus* R. Br.

MOSQUITO ORCHID

Slender herb up to 26 cm tall. Leaf ± basal, broadly ovate to cordate, mucronate, margin entire, sinuous or sometimes lobed, 2–4 cm × 1.3–3 cm, dark green above, purplish beneath, venation reticulate, conspicuous. Flowers 2–15, pedicels including ovary 5–8 mm long, subtended by broadly ovate bract 3–5 mm long; flowers light greyish purple, labellum darker; dorsal sepal narrowly ovate to narrowly obovate, ± concave, incurved, apical point filiform, ca 2 mm long, base tapered, 7–8 mm × 2–3 mm, lateral sepals with a dark central stripe, linear-subulate, parallel or divergent, apical point 2–2.5 mm long, glandular, base 7–8 mm long; petals narrowly ovate, acute, reflexed, 4–5 mm long; labellum greenish yellow with a dark central band and dark margin, on short contracted claw, ovate-cordate, 6–7 mm × 3–4 mm, concave towards base with 2 large smooth comma-like callosities, apex acute-caudate, thickened, basal part smooth, distal part ±

papillate, margin slightly irregular; column semiterete, exserted, incurved, not winged, 3.5–4 mm long. Capsules ellipsoid, 1–1.2 cm long.

Western parts of the Moreton district, e.g. Helidon, and along Great Dividing Ra., e.g. Mt Mitchell, Crows Nest, Bunya Mts, in eucalypt open forest. Flowers autumn–winter.

33. CYRTOSTYLIS R. Br.

Terrestrial glabrous herbs with small globular tuberoids. Leaf solitary, nearly as broad as long, sessile and ground-hugging. Flowers 1–few on a slender raceme; dorsal sepal narrow, erect or incurved, lateral sepals and petals very narrow, spreading, parallel or divergent; labellum sessile, immobile, flat, undivided, entire, 2 raised calli at base and 2 narrow flat plates on lamina; column \pm incurved, winged near apex; anther 2-locular, pollinia 4, clavate, a pair on each loculus, caudicle absent; viscidium of 2 parts; stigma oblong to cordate, sunken.

About 6 species Australia and New Zealand; 3 species Australia; 1 species south-eastern Queensland.

1. *Cyrtostylis reniformis* R. Br.

MOSQUITO ORCHID

Acianthus reniformis (R. Br.) Schlechter; *Cyrtostylis oblonga* J. D. Hook.; *Cyrtostylis macrophylla* J. D. Hook.; *Cyrtostylis rotundifolia* J. D. Hook.; *Caladenia reniformis* (R. Br.) H. B. Reichb.

Slender plant up to 15 cm tall. Leaf green on both surfaces, orbicular to cordate, 2–3.5 cm \times 1.5–3 cm, underside glistening with numerous swollen pellucid cells. Flowers 1–5, reddish brown or greenish brown, sessile or shortly pedicellate, subtending bract cordate, 3–5 mm long; dorsal sepal very narrowly ovate, blunt, margin often revolute, 0.8–1.2 cm \times 0.17–0.2 cm, lateral sepals linear, spreading, parallel or divergent, 8–10 mm \times ca 1 mm; petals linear, obtuse to acute, 8–10 mm \times ca 0.5 mm; labellum usually reddish brown throughout, oblong, projected forwards, with distal margin crenulate, 8–10 mm \times 3–4 mm, with conspicuous lateral veins, callus plates often shiny, glands conical; column incurved, dilated at base, 5–6 mm long, winged distally.

Recorded from near Stanthorpe in the Darling Downs district, in eucalypt open forest. Flowers late winter–spring.

34. ERIOCHILUS R. Br.

Small terrestrial glandular pubescent or hairy, rarely glabrous, herbs with small underground globular tuberoid. Leaf solitary, basal or cauline. Flowers 1–9, terminal on scape, pink or white; dorsal sepal erect, slightly incurved and concave, lateral sepals narrow, spreading or deflexed, usually longer than other segments; petals narrow, almost as long as dorsal sepal; labellum equal to or shorter than petals, on erect claw, basal margins often produced into small lateral lobes, midlobe recurved, convex above, glandular pubescent, without calli; column erect, sometimes ciliate in front or narrowly winged; anther erect, blunt, 2-locular, pollinia 8, 4 masses per locule, waxy or granular.

4 species endemic in Australia; 2 species south-eastern Queensland.

1. Leaves glabrous; plants up to 30 cm tall
- Leaves hairy; plants up to 12 cm tall

1. *E. cucullatus*
2. *E. autumnalis*

1. *Eriochilus cucullatus* (Labill.) H. G. Reichb.

PARSON'S BANDS

Epipactis cucullata Labill.

Very slender herb up to ca 30 cm tall, glandular pubescent. Leaf basal, sheathing, often undeveloped at flowering time, ovate, acute, base rounded, 1.2–5 cm \times 0.7–2.4 cm, glabrous. Flowers 1–5, pedicels including ovary 5–10 mm long, subtended by acute bract 2.5–4 mm long; flowers white to pale or bright pink; dorsal sepal narrowly obovate, slightly incurved, 0.6–1 cm long, lateral sepals elliptic to obovate, contracted into slender claw, spreading or slightly deflexed, 0.9–1.7 cm long; petals linear to linear-spathulate, 5–8 mm long; labellum elliptic-oblong, convex, recurved with erect concave narrow claw,

sometimes with minute lateral lobes or angles at apex, 7–9 mm long, glandular pubescent, without calli; column 5–7 mm long, narrowly winged below broad concave stigma. Capsules narrowly obovoid, 8–10 mm long. **Fig. 59C.**

Moreton and Wide Bay districts on the edges of or near swamps, and also in Girraween National Park in the Darling Downs district, near swamps. Flowers autumn.

2. *Eriochilus autumnalis* R. Br.

Very slender herb up to 12 cm tall, pubescent. Leaf basal, sheathing, often undeveloped at flowering time, ovate to cordate, 1–1.5 cm × 0.6–0.8 cm, hairy, veins prominent. Flowers 1–3, pedicels including ovary 4–6 mm long; flowers white or pale pink; dorsal sepal narrowly obovate, incurved, 0.6–0.8 cm long, lateral sepals elliptic to obovate, contracted into slender claw, spreading or slightly deflexed, 0.6–1 cm long; petals linear to linear-spathulate, 3–5 mm long, often recurved; labellum pink to reddish, elliptic, convex, recurved with erect concave narrow claw, with minute lateral lobes, 6–7 mm long, with tufts of stiff hairs; column 6–7 mm long, narrowly winged below broad concave stigma. Capsules narrowly obovoid.

Recorded from rock ledges of McPherson Ra. Flowers autumn–winter.

35. CALOCHILUS R. Br.

Terrestrial glabrous herbs with usually ovoid tuberoids. Leaf solitary, linear, channelled, bracts sometimes leaf-like. Flowers few or numerous, in a loose raceme; dorsal sepal broad, concave, lateral sepals broad, acute; paired petals usually smaller than sepals, ± falcate; labellum significantly different from paired petals, oblong at base then expanded into ovate or triangular part, upper surface densely hairy; column short and broad, wings broad, usually shortly joined basally in front, produced and joined behind but not beyond anther, terminating margin entire, slightly crested or papillose, glands usually one on either side of base of column; anther terminal, ± incumbent but not operculate, bluntly rostrate, pollinia 2, deeply 2-lobed, mealy, without viscidium, attached acrotronically to rostrum; stigma immediately below anther, centre of top surface usually produced into ± triangular appendage with rostellum attached.

11 species, New Guinea, Australia, New Caledonia, New Zealand; 7 species Australia; 5 species south-eastern Queensland.

- | | |
|--|------------------------------------|
| 1. Column without 2 glands at inside lower corner of wings, but with 2 plate-like calli on base of labellum | 1. <i>C. paludosus</i> 2 |
| Column with 2 glands at inside lower corner of wings | |
| 2. Glands on column wings connected by red or purplish ridge | 3 |
| Glands on column wings not connected by ridge | 4 |
| 3. Hairs of labellum of one colour throughout | 2. <i>C. robertsonii</i> |
| Hairs towards base of labellum deep reddish purple, towards tip pale and translucent | 3. <i>C. grandiflorus</i> |
| 4. Petals yellowish green with dark lines, base of labellum smooth, eglandular, or with raised lustrous lines ± fused and ending in a hair point | 4. <i>C. campestris</i> |
| Petals brownish with deep reddish purple lines; base of labellum densely crowded with purplish glands or papillose | 5. <i>C. gracillimus</i> |

1. *Calochilus paludosus* R. Br.

RED BEARD ORCHID

Mostly slender herb up to 90 cm tall, usually much less. Leaf rigid, linear-ovate, acute, keeled, usually 10–18(–27) cm long. Scape with 1–4 loose, acute bracts *ca* 4–6 cm long, pedicels including ovary 0.9–1.8 cm long, subtended by ovate acute bract 1.2–2.5 cm long; flowers 1–8, rarely –15, reddish, occasionally greenish; dorsal sepal ovate, cucullate or recurved, acute, 1.1–1.6 cm long, lateral sepals free, narrowly ovate, concave, divaricately spreading below labellum, acute, 0.9–1.5 cm long; petals triangular-falcate, concave, erect, 6–9 mm long, strongly marked by conspicuous red veins; labellum sessile on broad rectangular base, ± triangular, *ca* 2–2.7 cm long, including strap-shaped apical

appendage *ca* 0.7–1.4 cm long, covered with long reddish hairs, hairs reduced to small linear and rounded glands towards base, with 2 intramarginal short narrow raised plates at base; column *ca* 4 mm long, very broadly winged, without basal glands, bases of wings united in front by \pm prominent lobe or band.

Recorded from the Burleigh Heads area in southern Moreton district in 1945, possibly no longer in that area due to destruction of its habitat by residential development. Apparently to be found in damp places or on hard rocky ridges or on sandy heathlands. Flowers spring.

2. *Calochilus robertsonii* Benth.

PURPLISH BEARD ORCHID

Usually robust herb up to 45 cm tall. Leaf linear-subulate, 20–40 cm long. Scapes with 1–4 narrowly ovate acuminate stem-clasping bracts 6–10 cm long, pedicels including ovary usually 1.3–2.3 cm long, subtended by narrow acuminate bracts 0.7–3.5 cm long; flowers 1–9, green with purplish or red-brown markings; dorsal sepal ovate, cucullate, acute, 1.1–1.2 cm long, sometimes longer, lateral sepals narrowly ovate, divergent, acute, 1–1.1 cm long; petals yellowish with fine red longitudinal stripes, ovate, falcate, erect, 5–6.5 cm long; labellum golden yellow or green, sessile, triangular, 1.5–1.8 cm long, base fleshy, rectangular, covered with purple glands, expanded part densely bearded with long purple or bronze glistening hairs; column 5–6 mm long, broadly winged with purple gland at each lower angle, wings united basally by transverse raised red or purple ridge. Capsules ellipsoid, *ca* 1.5–1.7 cm long. **Fig. 59D.**

Recorded from Wolvi area near Gympie in the Wide Bay district and the Stanthorpe and Mt Norman areas in the Darling Downs district, on coarse gravelly soil under open forest. Flowers late winter–spring.

3. *Calochilus grandiflorus* (Benth.) Domin

GOLDEN BEARD ORCHID

Calochilus campestris R. Br. var. *grandiflorus* Benth.; *C. grandiflorus* Rupp nom. illeg. Slender or robust herb up to 1.1 m tall, usually much less. Leaf linear-subulate, triangular in section, erect, usually up to 20 cm long. Scapes with elongate acuminate loosely sheathing bracts *ca* 3–10 cm long, pedicels including ovary 1.3–2.3 cm long, subtended by ovate acuminate bracts 1.5–4 cm long; flowers 1–10, golden yellow and red-brown; dorsal sepal broadly ovate, broadly cucullate, erect or recurved, acute, 1.2–1.5(–2) cm long, lateral sepals ovate, divergent, acute, 1.1–1.4(–2) cm; petals finely marked with red stripes, ovate, acute, 7–9(–10) mm long; labellum sessile, triangular, 1.5–2 cm long, with sinuous papillose apical appendage 1–2 cm long, upper surface covered with long reddish purple or red-brown glabrous or papillose hairs basally reduced to sessile linear calli, anterior half with long erect less dense pale hairs with sparkling papillae; column 5–8 mm long, widely winged, very open at base with prominent dark coloured gland at each lower angle, glands connected by purplish ridge. Capsules ellipsoid to obovoid, 1.5–2 cm long.

Moreton and Wide Bay districts, in heathlands at low or high altitudes and also Girraween National Park in the Darling Downs district. Flowers spring–summer.

4. *Calochilus campestris* R. Br.

COPPER BEARD ORCHID

Calochilus herbaceus Lindl.; *C. cupreus* R. Rogers; *C. saprophyticus* R. Rogers

Robust herb often 45–75 cm tall. Leaf rigid, fleshy, deeply channelled, triangular in section, erect, sheathing basally, 12–45 cm long. Scapes with 1–3 green or coppery narrowly ovate acute stem-clasping bracts 5–8 cm long, pedicels including ovary 1.3–2 cm long, subtended by narrow acute bracts 1.5–4 cm long; flowers 7–15, rarely as few as 2, yellowish green with reddish brown, purplish or light rufous markings; dorsal sepal broadly ovate, cucullate, acute, 0.9–1.1 cm long, lateral sepals ovate, acute, slightly widened on each side of labellum, 0.8–1.1 cm long; petals yellowish green with dark lines, ovate, slightly falcate, acute, 5–6 mm long; labellum purple or greenish purple, broadly triangular with fleshy rectangular base and recurved apex tapering into short strap-like appendage with glandular margins, 1–1.4 cm long, basal part smooth, without glands, or with raised lustrous metallic blue, reddish blue, or purplish black plates, \pm fused and terminating in free hair points, triangular part with fimbriate margins and reddish blue glandular hairs with metallic lustre; column 4–6 mm long, very wide, lower angles with conspicuous glands. Capsules obovoid, *ca* 1.5–1.7 cm long.

Moreton, Wide Bay and Darling Downs districts, usually in swampy areas but sometimes from dry hillsides. Flowers spring–summer.

5. *Calochilus gracillimus* Rupp**LATE BEARD ORCHID**

Usually slender herb 20–45 cm tall, sometimes more. Leaf narrow, deeply channelled. Scape with usually 2 loosely sheathing bracts 8–10 cm long; flowers 2–8, reddish brown to purplish brown; dorsal sepal cucullate, acute, *ca* 1–1.5 cm long, lateral sepals narrowly ovate, divergent, acute, *ca* 1 cm long, petals brownish with deep reddish purple striae, ovate, falcate, shorter than lateral sepals; labellum narrowly triangular, slender, apex drawn out into a slender glabrous ribbon, up to 3 cm long, surface with crowded purplish glands or papillae at base, otherwise densely bearded with long reddish purple hairs each covered with glistening glands; column very short, narrow, wings rather inconspicuous, dark gland at each lower angle, glands unconnected.

Recorded from Glen Aplin, Girraween National Park, Wallangarra areas in the Darling Downs district. Flowers summer.

36. EPIDENDRUM L.

Epiphytic, lithophytic or rarely terrestrial herbs, small to large and robust, with or without conspicuous rhizome; stems caulescent or pseudobulbous, \pm branching. Leaves 1–many, terete or flattened. Inflorescences terminal or rarely lateral, racemose, subumbellate to paniculate, erect or curved; flowers minute to large, reversed; perianth segments \pm spreading; labellum slightly adnate to column, entire or 3-lobed, smooth or callose; column short to elongate, wingless to prominently winged; anther terminal, pollina 4, equal, waxy, \pm compressed.

About 400 species, tropical Americas; several species cultivated Australia; 1 hybrid naturalized south-eastern Queensland.

1. **Epidendrum* \times *obrienianum* Rolfe**CRUCIFIX ORCHID**

Scandent, up to *ca* 2 m tall, usually branched near base; stems not pseudobulbous; roots numerous, cord-like, arising opposite leaves, descending to ground. Leaves numerous along stem, sessile, ovate-oblong, emarginate, up to 5 cm \times 2 cm. Peduncles slender, sheathed by imbricate adherent bracts, terminating in many-flowered corymbiform raceme; flowers numerous, orange with bright yellow calli on midlobe, *ca* 3 cm across; sepals oblong-obovate, acute, 1.5–1.7 cm \times 0.6–0.7 cm; petals elliptic-obovate, acute, 1.4–1.5 cm \times 0.6–0.7 cm; labellum *ca* 1.7 cm long, 3-lobed, lobes fringed, midlobe bipartite, callus of 2 large erect teeth with 2 smaller ones behind them and a rounded keel in front of and between them.

Native of tropical America; commonly cultivated throughout the region, garden escape and occasionally naturalized near habitation. Flowers most of the year.

This is an artificial hybrid between *E. evectum* Hook. and *E. radicans* Pay.

37. CYMBIDIUM Swartz

Epiphytes or sympodial herbs; stems usually short and pseudobulbous, covered by overlapping sheathing bases of leaves. Leaves \pm linear-oblong, channelled or at least slightly concave above. Inflorescences arising from base of pseudobulb or near lower leaves; flowers 2–many, fragrant in Australian species; sepals and petals free, \pm similar to each other; labellum sessile on very short column foot, \pm 3-lobed, lateral lobes \pm erect and close to column, disc with 1 or 2 keels which are sometimes quite indistinct or modified; column rather long, projected straight ahead of ovary or curved forward; anther not distinctly rostrate, pollinia joined by common short caudicle, seated \pm directly on viscidium.

40 species, tropical Asia, Australia; 3 species Australia, occurring in south-eastern Queensland.

- | | | | | | |
|--|---|---|---|--------------------|---|
| 1. Stems thin, not pseudobulbous; leaves strongly striate | . | . | . | 1. <i>C. suave</i> | |
| Stems thick, pseudobulbous; leaves thick or thin but not striate | . | . | . | . | 2 |

2. Leaves thin, not rigid, not deeply channelled; labellum disc with 1 broad indistinct viscid keel
 Leaves thick, rigid, deeply channelled; labellum disc with 2 parallel keels

2. *C. madidum*
 3. *C. canaliculatum*

1. *Cymbidium suave* R. Br.

Cymbidium gomphocarpum Fitzg.

Stems up to ca 35 cm long, not pseudobulbous, densely covered with imbricate strongly striate remains of keels and fibres. Leaves not rigid, linear-oblong, acute, 15–45 cm × 1–2 cm, strongly striate. Racemes 10–25 cm long, sheathing bracts ovate, acuminate, 1.5–5 cm long, pedicels including ovary 0.8–2 cm long, subtending bracts obtuse, ca 1–5 cm long; flowers few-numerous, usually closely packed, light green, golden green or brownish green, sometimes with indistinct red blotches, highly fragrant; dorsal sepal obovate, mucronate, 1–1.5 cm long, lateral sepals obovate to oblong, 1–1.3 cm long; petals elliptic-obovate, 0.9–1.2 cm long; labellum 8–9 mm long, distinctly or indistinctly 3-lobed, lateral lobes pale brown or green, short, broad, midlobe usually yellow or pale green, as long as to twice as long as wide, disc dark brown entirely or for varying distances from base, somewhat thickened along middle; column 6–7 mm long, narrowly winged at top. Capsules ovoid-globular, up to 2.5 cm long. **Fig. 59E.**

Throughout the region, typically on hardwood trees in open forest, occasionally on rainforest margins, growing in hollows of branches or trunks or in decaying stumps. Flowers late winter to summer.

2. *Cymbidium madidum* Lindl.

Cymbidium iridifolium Cunn.; *C. albuciflorum* F. Muell.; *C. leai* Rendle; *C. queenianum* Klinge

Pseudobulbs bright green, large, 6–25 cm × 2–6 cm. Leaves up to 9, thin, linear-oblong, decurved, not deeply channelled, acute, 20–90 cm × 2–4 cm. Racemes arising from axils of lower bracts, pendulous, 20–60 cm long, pedicel including ovary 2–3 cm long, subtended by bracts 1–4 mm long; flowers 12–70, scattered, pale to dark brownish or olive-green; sepals all similar, oblong-obovate, ca 0.9–1.5 cm long; petals obliquely obovate, 0.8–1.3 cm long; labellum 0.9–1.5 cm × 0.4–0.6 cm, distinctly 3-lobed, lateral lobes green, crescent-shaped, midlobe yellow, subobovate, obtuse, apex and lateral margin decurved, disc with very broad low keel contracted near middle, glandular and slightly viscid; column 8–10 mm long, slightly decurved and dilated near apex. Capsules ellipsoid to obovoid, 3.5–4 cm long.

Coastal districts of the region, in or near rainforest where it frequently forms large masses on its supporting hosts, rarely on sandy soil in littoral communities. Flowers spring–summer.

3. *Cymbidium canaliculatum* R. Br.

Cymbidium hillii F. Muell.; *C. sparkesii* Rendle; *C. canaliculatum* var. *sparkesii* (Rendle) F. M. Bailey; *C. canaliculatum* var. *canaliculatum* forma *inconstans* Rupp; *C. canaliculatum* var. *marginatum* Rupp forma *fuscum* Rupp; *C. canaliculatum* var. *marginatum* forma *purpurascens* Rupp; *C. canaliculatum* var. *barrettii* Nicholls

Pseudobulbs usually grey-green, short, 3–14 cm × 1.5–4 cm, densely clustered together, covered with bases of withered and living leaves. Leaves 2–6, thick, rigid, elongate, keeled, very deeply channelled, acute, up to 60 cm × 4 cm, racemes 1–2 per stem, arising from lower axils, erect to pendulous, 15–40 cm long, sheathing scales at base of peduncle rigid, pedicel including ovary 2–5 cm long, subtended by bracts 2–4 mm long; flowers 12–numerous, green, brown, purple, dull red or a combination of these, or mottled or banded; sepals ± similar, narrowly ovate to oblong-obovate, acute or blunt, 1.2–2.5 cm long; petals narrowly ovate to ovate, acute or blunt, 1–2 cm long; labellum usually whitish marked with red or purple, ovate to oblong-ovate in outline, 0.9–1.8 cm long, distinctly 3-lobed, lateral lobes ± crescent-shaped, midlobe ovate to triangular, usually decurved, acute to obtuse, upper surface usually concave and papillose, disc between lateral lobes with two longitudinal raised plates, slightly pubescent or shortly fringed; column 6–9 mm long, slightly incurved, with 2 narrow longitudinal wings. Capsules obloid to obovoid, 3–5 cm long.

Scattered throughout the region, usually in the drier parts, growing in hollows in branches or trunks of trees, in light shade or full sun. Flowers spring–summer.

38. PARASARCOCHILUS Dockr.

Small monopodial epiphytes with short stems and thin leaves. Inflorescences racemose, few-flowered; flowers small, lasting for many days; sepals and petals free, \pm similar but petals slightly shorter, falcate; labellum articulate on apex of column foot, horizontal or obliquely deflexed, protruding beyond perianth, deeply saccate, 3-lobed, lateral lobes linear, erect, long, flanking column, midlobe saccate, thin-walled, narrow, glabrous or hairy; column short, with a foot, obliquely erect; anther 2-locular, rostrate, pollinia 4 in 2 closely appressed pairs, stipe not greatly elongate; viscidium \pm small; rostellum small, stigma sunken.

2 species endemic in Australia; 1 species south-eastern Queensland.

1. *Parasarcochilus spathulatus* (R. Rogers) Dockr.

Sarcochilus spathulatus R. Rogers; *Pteroceras spathulatus* (R. Rogers) Garay

Small epiphyte with elongated filiform flexuose roots; stems very short, covered with dry persistent remains of fallen leaves. Leaves 2–5, shiny, narrowly falcate or elliptic, erect, spreading, acute, base tapered, 1–8 cm \times up to ca 1.5 cm. Racemes short, pedicel including ovary 3–6 mm long, subtended by bract 1–2.5 mm long; flowers 1–4, greenish yellow with purplish brown markings, very fragrant; dorsal sepal ovate-oblong or elliptic-oblong, concave, blunt, 5–6 mm long, lateral sepals falcate-oblong, blunt, ca 5–7 mm long, obliquely adnate to distal half of column foot; petals falcate, usually spreading, blunt, 5–6 mm long; labellum cream to white with purple markings, attached by short moveable claw to tip of slender column foot, ca 7–8 mm long, 3-lobed, lateral lobes narrowly oblong or linear-spathulate, erect, large, 4–5 mm long, abruptly dilated at apices, midlobe shorter, cushion-like, with an inturned tooth, anterior margin purple, convex, pubescent, with 2 purple vertical tooth-like markings immediately below it, spur flat, oblong, blunt, hollow, glabrous inside; column ca 2–2.5 mm long, foot slender, elongate; pollinia 4. **Fig. 59F.**

Recorded from the Queensland/New South Wales border north to about the Bunya Mts, generally in vine forest at higher altitudes, e.g. Lamington Plateau, Mt Tamborine, Mt Ballow. Flowers spring.

39. RHINERRHIZA Rupp

Moderate sized monopodial epiphytes; roots robust, semicylindrical, papillose-rough; stems short. Leaves harsh and dry in texture. Inflorescences many-flowered, developing in 1 or 2 spasms; flowers fugacious; sepals and petals \pm similar, very slender; labellum articulate on apex of column foot, small, 3-lobed, with pouch-like spur in front, lateral lobes erect, incurved, large, apices overlapping, midlobe on top of spur extremely small, disc with large high double-headed callus and tooth-like callus margins from base of each lateral lobe opposite large disc callus; column short with long foot set at acute angle to it; anther peaked, rostrate, pollinia 4 in 2 closely appressed pairs, stipe short, lorate; viscidium rather small, appearing to be a continuation of stipe; rostellum of 2 rather widely separated decurved tooth-like arms.

2 species endemic in eastern Australia; 1 species south-eastern Queensland.

1. *Rhinerrhiza divitiflora* (F. Muell. ex Benth.) Rupp

RASPY ROOT

Sarcochilus divitiflorus F. Muell. ex Benth.; *Thrixspermum divitiflorum* (F. Muell. ex Benth.) H. G. Reichb.

Stems erect or subpendulous, robust, 6–8 cm long, base covered by large scarious remains of sheathing leaf bases. Leaves 3–6, coarse and leathery, elliptic to oblong, obtuse mucronate, base obtuse, margin undulate, 4–18 cm \times 1–3 cm. Inflorescences 1–4, pendulous, 6–45 cm long, peduncle short, pedicel including ovary 2–3 mm long, subtended by acuminate bracts 2–4 mm long; flowers 6–60, fugacious, pale orange with red blotches and spots and white labellum; sepals and petals \pm similar, linear-triangular, tapering to long filiform points, 3–5 cm \times 0.15–0.2 cm, petals usually slightly shorter than sepals; labellum on a narrow claw, 3–5 mm long, lateral lobes marked inside with

subvertical irregular red striae, suboblong, incurved, obtuse, 3–4 mm long, midlobe *ca* 0.5 mm long, triangular, obtuse, spur erect, central, *ca* 1.5 mm long; column *ca* 2 mm long with narrow foot *ca* 2 mm long. Capsules narrowly cylindrical, 3–5 cm × 0.3–0.4 cm.

Widespread in the coastal districts in lowland and higher altitude rainforest, e.g. Mt Tamborine, Bunya Mts, occasionally in open forest; common. Flowers late winter–spring.

40. SARCOCHILUS R. Br.

Monopodial epiphytes or lithophytes; roots smooth, slender to rather thick and fleshy; stems short or elongated, stem bases covered with scarious remains of sheathing leaf bases. Leaves not numerous, close together, ± flat or thick and channelled, mostly ± falcate. Inflorescences racemose; flowers few–many, fragrant; sepals and petals free, ± equal, lateral sepals jointed at least in part to column foot; labellum articulate at apex of column foot, shallowly saccate, 3-lobed, spurred in front, lateral lobes large, ± erect, midlobe attached to top of spur near its orifice, very small, usually fleshy, the thickening continued down wall of spur, spur short, often poorly developed, never cylindrical, ± fleshy or hollow, disc usually with large, ± erect fleshy longitudinally grooved callus (absent in *S. weinthalii*); column short, foot well developed; anther 2-locular, rostrate, pollinia 4 in 2 closely appressed pairs, members of each pair unequal, stipe not greatly elongate; viscidium of moderate size, usually attached to ventral surface of rostellum; rostellum small.

12 species, New Guinea, Solomon Is, Australia, Polynesia; 12 species Australia; 10 species south-eastern Queensland.

1. Flowers white or pink, segments broad	.	.	.	.	.	.	.	.	.	.	2
Flowers green, brown or dull red, segments narrow	.	.	.	.	.	.	.	.	.	.	8
2. Labellum with hairs on midlobe	.	.	.	.	.	.	.	.	.	.	3
Labellum without hairs on midlobe	.	.	.	.	.	.	.	.	.	.	5
3. Flowers campanulate, segments <i>ca</i> 6 mm long; plants lithophytic	.	.	.	.	.	.	.	.	.	1. <i>S. ceciliae</i>	4
Flowers not campanulate, segments <i>ca</i> 4 mm long; plants epiphytic	.	.	.	.	.	.	.	.	.	.
4. Spur directed backwards; midlobe of labellum protruding well in front of lateral lobes	.	.	.	.	.	.	.	.	.	2. <i>S. hillii</i>	
Spur directed forwards; midlobe of labellum as long as lateral lobes	.	.	.	.	.	.	.	.	.	3. <i>S. minutiflos</i>	
5. Plants epiphytic; stems short; leaves thin and falcate	.	.	.	.	.	.	.	.	.	.	6
Plants lithophytic; stems long, branching; leaves long, rather thick	.	.	.	.	.	.	.	.	.	.	7
6. Flowers white, unspotted; calli present on labellum, grooved, central, tall	.	.	.	.	.	.	.	.	.	4. <i>S. falcatus</i>	
Flowers white or cream, heavily blotched; calli absent from labellum	.	.	.	.	.	.	.	.	.	5. <i>S. weinthalii</i>	
7. Lateral lobes of labellum twice as long as broad	.	.	.	.	.	.	.	.	.	6. <i>S. fitzgeraldii</i>	
Lateral lobes of labellum as long as broad	.	.	.	.	.	.	.	.	.	7. <i>S. hartmannii</i>	
8. Spur of labellum decurved, very thin, oblong-ovate, 4–6 mm long	.	.	.	.	.	.	.	.	.	8. <i>S. australis</i>	
Spur of labellum obtuse or subconical, 1–2 mm long	.	.	.	.	.	.	.	.	.	.	9
9. Flowers green to yellow-green; lateral lobes of labellum twice as long as broad, tapered to blunt point, curved forward; pedicel including ovary 6–10 mm long	.	.	.	.	.	.	.	.	.	9. <i>S. olivaceus</i>	
Flowers brown to reddish brown; lateral lobes of labellum 1.5 times as long as broad, very rounded; pedicel including ovary 3–5 mm long	.	.	.	.	.	.	.	.	.	10. <i>S. dilatatus</i>	

1. *Sarcochilus ceciliae* F. Muell. FAIRY BELLS
Small erect lithophyte growing into densely packed tufts; roots thick; stems 2–12 cm long. Leaves usually brownish green and spotted, thick, usually linear or very narrowly elliptic, channelled, 2–12 cm × 0.2–1 cm. Racemes rigidly erect or sometimes ± pendulous, up

to ca 18 cm long, pedicel including ovary 3–6 mm long, subtended by bracts 1–2 mm long; flowers 3–15, pale to bright pink, mauve-pink or purple, or occasionally white, usually cup-shaped, sometimes opening widely; dorsal and lateral sepals similar, obovate to oblong-obovate, 4–7 mm \times 1.5–3 mm; petals oblong-obovate, 4–6 mm \times 1–1.5 mm; labellum ca 2–3 mm long, lateral lobes oblong-falcate, 2–3 mm long, pubescent within and on margins, midlobe thick, ca 1–1.5 mm \times ca 2.5 mm but variable, prominently tomentose, spur obscure, fleshy, broad, ca 1 mm long, calli golden, central calli erect, double-headed, side calli higher, \pm adnate to lateral lobes; column ca 1.5–2 mm long, bluntly winged near apex, foot prominent, slightly longer. Capsules very narrowly cylindrical, 2–3.5 cm \times ca 0.2–0.3 cm.

Two varieties occur in the region:

1. Flowers pale to dark pink, cup-shaped; sepals and petals usually broad *S. ceciliae* var. *ceciliae*
 Flowers glistening white, opening widely; sepals and petals narrow *S. ceciliae* var. *albus*

S. ceciliae var. *ceciliae* (*Thrixspermum ceciliae* (F. Muell.) H. G. Reichb.; *S. eriochilus* Fitzg.) has been recorded from the Moreton and eastern Darling Downs districts, growing on rocks or rock faces often beside or near streams, usually in fairly sheltered areas of rainforest or open forest. *S. ceciliae* var. *albus* Hunt has been recorded from the Mt Tamborine area in southern Moreton district. Both flower mainly summer.

2. *Sarcochilus hillii* (F. Muell.) F. Muell.

Dendrobium hillii F. Muell.; *Thrixspermum hillii* (F. Muell.) H. G. Reichb.

Small epiphyte or occasionally lithophyte; roots numerous, tangled, relatively long; stems usually short. Leaves 2–10, dark green, spotted, thick, linear, channelled, acute, 1.5–10 cm \times 0.1–0.3 cm. Racemes 1–4, \pm pendulous, flexuose, 3–10(–15) cm long, pedicel including ovary 3–6 mm long, subtending bracts acute, 1–2 mm long; flowers 2–10, frosty white or pale pink, fragrant; perianth segments \pm similar, ovate, oblong or obovate, concave, obtuse, 4–6.5 mm \times 2–3.5 mm; labellum \pm sessile on short column foot, 3–4 mm long, lateral lobes purple-striped inside, suboblong, 1.5–2 mm long, midlobe suberect, retuse, ca 1–1.5 mm long, densely white glandular pubescent inside, spur fleshy, decurved or recurved, conical, 1–1.5 mm long, central callus yellow, double-headed, ca 1 mm high, side calli yellow, prominent; column ca 2 mm high, foot \pm at right angles to it, thick, ca 1.5 mm long. Capsules narrowly cylindrical, 3.5–5.5 cm long. **Fig. 59H.**

Darling Downs, Burnett and Moreton districts, usually in depauperate rainforest. Flowers spring–summer.

3. *Sarcochilus minutiflos* F. M. Bailey

Sarcochilus tricallitatus Rupp

Small epiphyte; roots numerous, tangled, relatively long; stems short. Leaves 2–10, dark green, spotted, linear, channelled, acute, 2–10 cm \times 0.1–0.5 cm. Racemes 1–4, \pm pendulous, flexuose, 2–10 cm long, pedicel including ovary 3–6 mm long, subtending bracts acute, 1–2 mm long; flowers 2–8, white, fragrant; perianth segments \pm similar, ovate, oblong or obovate, concave, obtuse, 3.5–6 mm \times 2–4 mm; labellum \pm sessile on short column foot, 3–4 mm long, lateral lobes purple-striped inside, oblong, 2–2.2 mm long, midlobe erect, thick, obtuse, ca 2.5 mm long, densely glandular pubescent inside, spur obscure, fleshy, directed forward, ca 0.5 mm long, central callus yellow, grooved, ca 1 mm high, side calli yellow, similar height to central callus; column ca 1.5 mm high, foot thick, ca 2 mm long, \pm at right angles to column. Capsules narrowly cylindrical, 4–5 cm long.

Burnett district, usually in depauperate rainforest. Flowers spring–summer.

Exact range uncertain due to confusion with *S. hillii* (F. Muell.) F. Muell.

4. *Sarcochilus falcatus* R. Br.

ORANGE BLOSSOM ORCHID

Thrixspermum falcatum (R. Br.) H. G. Reichb.; *Sarcochilus montanus* Fitzg.; *S. falcatus* R. Br. var. *montanus* (Fitzg.) C. Moore

Semipendulous epiphyte; stems 1–8 cm long. Leaves 3–8, pale green, thick, narrowly oblong-obovate, or narrowly elliptic, often asymmetrical, usually falcate, 5–16 cm \times

0.7–2.3 cm. Racemes usually semipendulous, black when dried, pedicel including ovary 1–1.7(–3) cm long, subtending bracts broadly ovate, acuminate, 4–7 mm long; flowers 3–12, white or rarely cream, fragrant, resembling orange blossom; sepals and petals \pm similar, ovate to obovate, usually slightly concave, apex rounded, base contracted, 0.8–1.6 cm \times 0.4–0.9 cm, often with purplish red median line outside; labellum 3.5–6 mm long, lateral lobes usually orange inside and with transverse bright or dark red striae, oblong, 4–7 mm \times 3–5 mm, midlobe yellowish, fleshy, narrow, erect, *ca* 1 mm long, spur projected forward with rounded apex, *ca* 2–2.5 mm long, central callus large, bifid, calli on side walls not well developed; column 2–4 mm long, foot at right angles to it, 3–5 mm long. Capsules cylindrical, up to *ca* 6.5 cm long. **Fig. 59G.**

Mainly Moreton and Darling Downs districts in mountainous areas, e.g. Springbrook, Killarney area, Bunya Mts, on rainforest or closed forest trees. Flowers mainly late winter–spring.

5. *Sarcochilus weinthalii* F. M. Bailey

Sarcochilus longmanii (F. M. Bailey) F. M. Bailey; *Parasarcochilus weinthalii* (F. M. Bailey) Dockr.

Small epiphyte; roots white, fleshy; stems short. Leaves 3–7, dark green to yellowish green, oblong to oblong-obovate, sometimes slightly falcate, usually obtuse, 3–9 cm \times 0.5–1.2 cm. Racemes 1 or 2, pendulous, usually 2–7 cm long, pedicel including ovary 2–5 mm long, subtending bract 2–3 mm long; flowers 3–12, cream or white irregularly blotched with dull purple or purplish red; sepals \pm similar, obovate or oblong-obovate, obtuse, 7–10 mm \times 3–4 mm; petals obovate or oblong-obovate, obtuse or sometimes mucronate, 5–8 mm \times 2.5–3 mm; labellum sessile at end of column foot, *ca* 1.5–2 mm long, lateral lobes narrowly oblong, falcate, incurved, blunt, *ca* 4 mm long, midlobe almost globular, vestigial, spur *ca* 2 mm high, disc woolly-glandular, without calli; column *ca* 1–2 mm long, column foot almost at right angles to it, *ca* 3 mm long. Capsules cylindrical, ribbed, up to *ca* 6 cm long.

Recorded from vicinity of Toowoomba, and Lamington National Park in the Moreton district, usually an epiphyte in rainforest on ranges not particularly close to the coastline. Flowers late winter–spring.

6. *Sarcochilus fitzgeraldii* F. Muell.

RAVINE ORCHID

Sarcochilus fitzgeraldii var. *alba* Hort. ex Schmidt; *S. fitzgeraldii* var. *aemulus* Rupp

Lithophyte or rarely epiphyte, growing into extensive masses; stems branching, up to 1 m long but usually much shorter, mostly covered with scarious remains of sheathing leaf bases. Functional leaves 4–8, narrowly oblong or narrowly oblong-ovate, sometimes slightly falcate, channelled, apex acute or blunt, base contracted, 6–20 cm \times 1–1.5 cm. Racemes 1–5, erect or pendulous, 10–25 cm long, pedicel including ovary 1–2 cm long, subtending bract narrow, 2–4 mm long; flowers 4–15, usually white with basal third blotched crimson or cerise, or sometimes all reddish; dorsal sepal \pm ovate, apex rounded, base contracted, 1.2–1.5 cm \times 0.6–0.8 cm, lateral sepals oblong-obovate, 1.3–1.7 cm \times 0.7–0.9 cm; petals oblong to obovate, obtuse, contracted, 1.2–1.5 cm \times 0.6–0.8 cm; labellum 5–6 mm long, lateral lobes oblong, somewhat falcate, *ca* 5–7 mm \times 2–4 mm, midlobe indistinct, spur fleshy, projected forward, obtuse, *ca* 2 mm long, disc very thick, callus bifid, large, side calli not well developed; column *ca* 2 mm long, foot almost at right angles to it, slightly curved, *ca* 3 mm long. Capsules cylindrical, up to *ca* 8.5 cm long.

Southern Moreton district in mountainous areas, e.g. Springbrook, Lamington National Park, generally on rocks or cliffs in shady areas such as creeks and ravines. Flowers spring.

7. *Sarcochilus hartmannii* F. Muell.

Thrixspermum hartmannii (F. Muell.) H. G. Reichb.; *Sarcochilus rubricentrum* Fitzg.; *T. rubrocinctum* (Fitzg.) H. G. Reichb.; *S. fitzgeraldii* var. *rubricentrum* (Fitzg.) Maiden & Betche

Lithophyte, often growing into large dense masses, but usually in relatively small clumps; stems branching, up to 1 m long, usually much shorter. Functional leaves 4–10, coriaceous, thick, oblong to narrowly oblong-ovate, often falcate, channelled, acute or obliquely emarginate, 5–20 cm \times 1–2 cm. Racemes 1–4, erect or pendulous, 6–25 cm

long, pedicel including ovary 0.8–2 cm long, subtending bract 3–5 mm long; flowers 5–25, white with deep maroon spots, or all white, lateral lobes of labellum red-striate; dorsal sepal ovate or obovate, obtuse, base contracted, 0.8–1.6 cm \times 0.4–0.8 cm, lateral sepals similar; petals obovate or oblong-obovate, obtuse, \pm tapered, 0.7–1.4 cm \times 0.3–0.6 cm; labellum *ca* 2–3 mm long, lateral lobes oblong to squarish, apex rounded, 2–4 mm long, midlobe 0.5–1 mm long, spur fleshy, directed forward and down, *ca* 1–2 mm long, central callus low, narrow, deep, side calli not very prominent; column blotched with red, stout, 1–2 mm long, foot almost at right angles to it, 1.5–2.5 mm long. Capsules cylindrical, up to *ca* 8.5 cm long.

Mainly southern Moreton district, e.g. Springbrook, Lamington National Park, but extending north to Maleny on ranges up to 900 m altitude, usually on exposed cliffs but sometimes near creeks in shady positions. Flowers spring.

8. *Sarcochilus australis* (Lindl.) H. G. Reichb.

Gunnia australis Lindl.; *Sarcochilus parviflorus* Lindl.; *S. barklyanus* F. Muell.; *S. gunnii* F. Muell.; *Thrixspermum australis* (Lindl.) H. G. Reichb.; *T. parviflorum* (Lindl.) H. G. Reichb.

Small epiphyte; stem usually up to 2 cm long. Leaves 3–10, coriaceous, oblong to elliptic, or narrowly so, usually only slightly falcate, acute, base usually tapered, 2–7 cm \times 0.3–1.4 cm. Racemes 1–4, pendulous, 3–16 cm long, pedicel including ovary 4–8 mm long, subtending bract acute, *ca* 2 mm long; flowers 2–17, held vertically, pale yellowish green to brownish; dorsal sepal narrowly oblong-obovate, blunt, 0.7–1.2 cm long, lateral sepals similar, 0.8–1.5 cm long; petals very narrowly obovate, blunt, *ca* 0.5–1 cm long; labellum white suffused with yellow and lateral lobes with prominent red or purple longitudinal stripes, 5–8 mm long, lateral lobes \pm oblong, apex rounded, 4–6 mm long, midlobe erect, \pm ovoid or obovoid, *ca* 1 mm long, spur solid, very thin, decurved from front of disc, oblong-ovate, mucronate, 4–6 mm long, central callus attached to base of spur, side calli and midlobe, *ca* 1 mm high, deeply grooved on top, side calli very prominent, higher than central one; column *ca* 2 mm long, foot at right angles to it, *ca* 4 mm long. Capsules cylindrical, up to 6 cm long.

Apparently reported from Great Dividing Ra., e.g. Toowoomba area (Main Ra.), Bunya Mts, and Lamington National Park, on trees; rare. Flowers usually spring.

9. *Sarcochilus olivaceus* Lindl.

Thrixspermum olivaceum (Lindl.) H. G. Reichb.; *Sarcochilus olivaceus* var. *borealis* Nicholls

Epiphyte or occasionally lithophyte; stems up to 7 cm long. Leaves dark green, thin, \pm oblong, ovate or obovate, slightly falcate, 2.5–12 cm \times 1–3.5 cm. Racemes pendulous, 2–10 cm long, pedicel including ovary 6–10 mm long, subtending bract acute, 1–3 mm long; flowers 2–12, olive-green or golden green, delicately fragrant; sepals spatulate or narrowly oblong-obovate, apex obtuse or blunt, 0.6–1.2 cm \times 0.2–0.4 cm, lateral sepals dilated basally and adnate to column foot; petals narrowly oblong-obovate, 0.5–1.1 cm \times 0.15–0.3 cm; labellum whitish with red markings, *ca* 3–4 mm long, lateral lobes oblong-ovate and usually falcate, *ca* 4 mm long, midlobe \pm erect or curved forward, *ca* 1 mm long, spur fleshy, obtuse, *ca* 1.5–2 mm long, central callus grooved, prominent, side calli prominent; column *ca* 2 mm long, foot set at oblique angle, slightly longer. Capsules very narrowly cylindrical, 2.5–5 cm long.

Moreton, Darling Downs and Wide Bay districts, usually in rainforest. Flowers usually late winter–spring.

10. *Sarcochilus dilatatus* F. Muell.

Thrixspermum dilatatum (F. Muell.) H. G. Reichb.; *Sarcochilus bancroftii* F. M. Bailey

Small pendulous epiphyte; stems up to 3 cm long. Leaves 4–12, dark green, coriaceous, elliptic or oblong-obovate, often slightly falcate, apex acute to obtuse, base tapered, 1.5–7 cm \times 0.4–1.2 cm. Inflorescences 1–6, pendulous, 1.5–7 cm long, pedicel including ovary 3–5 mm long, subtending bract *ca* 1–2 mm long; flowers 2–12, usually pale green with brown markings, sometimes all brick-red or green; sepals \pm similar, spatulate on broad claw, blunt, 6–9 mm \times 1.5–3 mm at spatulate part, claw *ca* 1–1.5 mm wide; petals

narrowly spatulate to narrowly oblong-obovoid, obtuse, 6–8 mm \times 1–1.5 mm; labellum 3–5 mm long, longitudinal striae on basal half of lateral lobes, lateral lobes oblong, rounded, 4–6 mm long, midlobe subconical, apex yellow, *ca* 1 mm long, spur subconical, apex usually yellow, *ca* 1–2 mm long, central callus prominent, *ca* 1 mm high, lateral calli very prominent; column 1–2 mm long, foot \pm at right angles, 2–3 mm long. Capsules narrowly ellipsoid to ellipsoid, 2–2.5 cm long.

Recorded from Mundubbera, Eidsvold and Durong areas of Burnett district and the Brisbane Valley in the Moreton district. Flowers mainly spring.

41. PLECTORRHIZA Dockr.

Small monopodial epiphytes; roots numerous, long and often tangled; stems rather long, wiry. Leaves relatively persistent, thin. Inflorescences racemose, bracts minute; flowers small, strongly fragrant; perianth segments free, widely spreading, \pm same length; labellum immoveable, indistinctly joined to short column foot, saccate, 3-lobed, spurred at rear, lateral lobes small, not touching column, midlobe small, hollow or fleshy, spur hollow with hirsute finger-like callus arising from anterior wall near orifice and pointing towards apex; column erect, not winged, foot very short, in line with column, anther with long recurved or reflexed rostrum, pollinia 4 in 2 clearly appressed even pairs, stipe 2–4 times length of pollinia, slender, slightly dilated near apex, retinaculum small, slender, adhering to ventral surface of rostellum; rostellum long, projected forward.

3 species, Australia, Lord Howe I.; 2 species Australia, both occurring in south-eastern Queensland.

1. Spur of labellum 1.5–3 mm long, spur and disc \pm at right angles to column; coastal districts of the region

1. *P. tridentata*

- Spur of labellum 5–7 mm long, spur in line with column; Wide Bay district north from Noosa R.

2. *P. brevilabris*

1. *Plectorrhiza tridentata* (Lindl.) Dockr.

TANGLE ORCHID

Cleisostoma tridentata Lindl.; *Saccolabium calcaratum* F. Muell.; *Sarcochilus tridentatus* (Lindl.) H. G. Reichb.; *Sarcochilus calcaratum* (F. Muell.) F. Muell.; *Thrixspermum tridentatum* (Lindl.) H. G. Reichb.; *C. cornutum* Rupp; *T. tridentatum* (Lindl.) Hunt nom. illeg.

Roots numerous, long and tangled; stems up to 30 cm long, usually much shorter. Leaves 4–10, narrowly elliptic or elliptic, to narrowly oblong-obovate, acute or blunt, tapered, 2.5–10 cm \times 0.4–1.6 cm. Inflorescences 1–6, 4–12 cm long, pedicel including ovary 3–7(–10) mm long, subtending bract *ca* 1 mm long; flowers 3–15, segments brown and green or dark and light green with lateral lobes of labellum white, green patch near base; sepals oblong-obovate or elliptic, blunt to acuminate, 3.5–6 mm \times *ca* 1.5–2 mm; petals oblong, obtuse, 3–4.5 mm \times *ca* 1 mm; labellum 6–7 mm long, spur and disc \pm at right angles to column, lateral lobes triangular or subfalcate, directed outward and forward, *ca* 2 mm long, midlobe resembling toe of slipper, *ca* 1.5 mm long, spur narrowly cylindrical to narrowly conical, rounded, slightly curved, 1.5–3 mm long; column *ca* 3 mm long. Capsules narrowly cylindrical, 3–7 cm long. **Fig. 591.**

Coastal districts of the region at low altitudes or low on the ranges, on trees of rainforest or moist eucalypt forest bordering rainforest. Flowers spring–summer.

2. *Plectorrhiza brevilabris* (F. Muell.) Dockr.

Cleisostoma brevilabre F. Muell.; *Sarcochilus brevilabris* (F. Muell.) F. Muell.; *Sarcochilus brevilabris* (F. Muell.) F. M. Bailey; *Saccolabium brevilabre* (F. Muell.) Rupp; *Saccolabium loaderianum* Rupp

Roots usually not as tangled as on *P. tridentata*; stems usually up to 10 cm long but recorded to 50 cm long. Leaves 3–7, usually narrowly elliptic or elliptic to oblong, acute or obtuse, unequally emarginate, tapered, 3–8 cm \times 0.7–1.7 cm. Inflorescences 1–4, 3–17 cm long, peduncle and rachis wiry, often red, pedicel including ovary 6–10 mm long, subtending bract *ca* 1 mm long; flowers 3–20, segments pale green or greenish cream with central patch of dull red or brown, spur green, labellum lobes white, laterals with central green patch; dorsal sepal ovate to elliptic, cucullate, obtuse, *ca* 4–5 mm \times *ca*

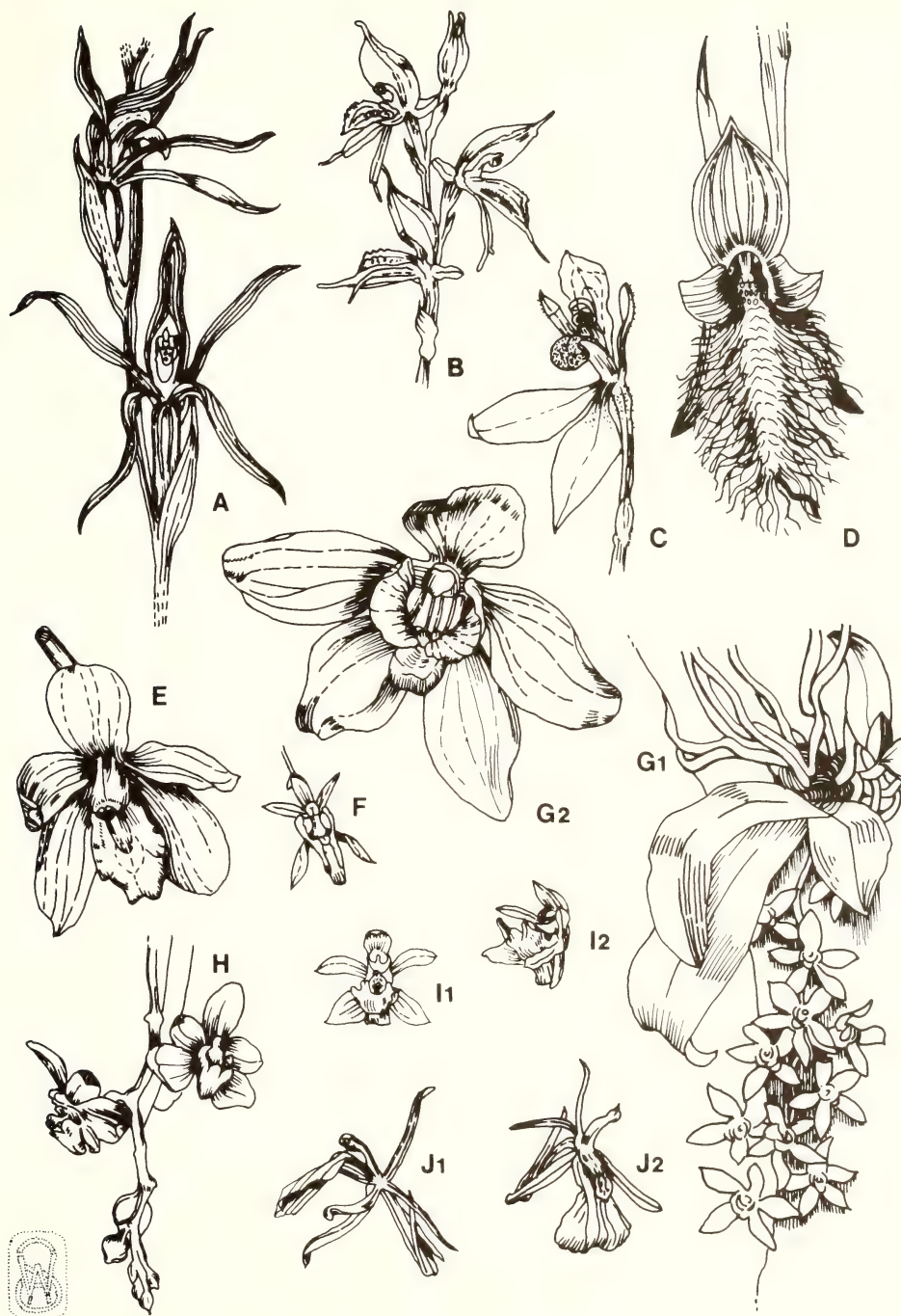


Fig. 59 ORCHIDACEAE — A *Lyperanthus suaveolens*, part inflorescence x 1; B *Acianthus fornicatus*, part inflorescence x 1½; C *Eriochilus cucullatus*, flower x 1½; D *Calochilus robertsonii*, flower x 2; E *Cymbidium suave*, flower x 2; F *Parasarcophilus spathulatus*, flower x 1; G₁–G₂ *Sarcophilus falcatus*, G₁ habit x ½, G₂ flower x 1½; H *Sarcophilus hillii*, part inflorescence x 1½; I₁–I₂ *Plectorhiza tridentata*, flower, I₁ front view, I₂ side view, both x 1½; J₁–J₂ *Liparis coelogyoides*, flower, J₁ side view, J₂ front view, both x 1½.

2 mm, lateral sepals oblong to oblong-elliptic, blunt, *ca* 4–6 mm \times *ca* 1.5 mm; petals oblong, blunt, 4–5 mm \times *ca* 1.5 mm; labellum 6–7 mm long, spur in line with column, lateral lobes suberect, curved outward, transverse-oblong, 0.5–1 mm high, midlobe thick, triangular, concave, \pm horizontal, spur subcylindrical, curved slightly forward, 5–7 mm long; column *ca* 4 mm long. Capsules narrowly cylindrical to narrowly ellipsoid.

Recorded from the Wide Bay district from the Noosa R. northwards, generally in low altitude rainforest. Flowers late spring–summer.

42. DENDROBIUM Sweet

Sympodial epiphytes or lithophytes, rarely terrestrial, rhizomes tufted or creeping; stems various. Leaves various. Inflorescences usually racemes, rarely flowers solitary; sepals \pm equal, variable, lateral sepals unequally dilated at base and connate with column to form mentum; petals often as long as or longer than dorsal sepal; labellum usually 3-lobed, base joined to apex only of column foot, or sometimes to part of sides as well to form closed spur, lateral lobes variable, usually embracing column, disc usually with keels or crests; column with pronounced foot, apex of column with 2 short \pm erect teeth, rarely winged; anther usually rostrate, pollinia 4, in 2 closely appressed pairs, without caudicles or stipes, nor usually viscidium.

1400 species, tropical Asia, Polynesia, Australasia; 53 species Australia; 18 species south-eastern Queensland.

- | | | |
|---|-----------|---|
| 1. Plants with pseudobulbs or stems growing in tufts, often grooved longitudinally, with leaves near apex only | | 2 |
| Plants with stems creeping or aerial, often pendulous, never pseudobulbous, usually branched with numerous leaves | | 11 |
| 2. Plants with 1 or 2 thin leaves on short pseudobulbs | | 3 |
| Plants with 2–7 thick or thin leaves, on elongated stems ("canes"), not on short pseudobulbs | | 4 |
| 3. Leaves usually solitary; midlobe of labellum distinct | | 1. <i>D. monophyllum</i> |
| Leaves usually in pairs; midlobe of labellum vestigial | | 2. <i>D. schneiderae</i> |
| 4. Stems \pm drooping, very slender in proximal half then dilating and becoming 4-angled | | 3. <i>D. tetragonum</i> |
| Stems \pm erect, not 4-angled | | 5 |
| 5. Stems \pm swollen from close to base | | 6 |
| Stems not swollen close to base | | 8 |
| 6. Stems tapered evenly to slender apex, comparatively slender above swollen base; flowers usually pink, rarely white | | 4. <i>D. kingianum</i> |
| Stems moderately to very robust throughout, at most slightly tapered; flowers white, cream or yellow, rarely with pink suffusions | | 7 |
| 7. Stems robust, cylindrical to slightly fusiform, 8–100 cm \times 1–6 cm, shallowly grooved; labellum 1.5–3 cm \times 1.2–2.4 cm | | 5. <i>D. speciosum</i> |
| Stems tapering slightly to moderately broad apex, 10–40 cm \times 1–3 cm, not grooved; labellum 0.9–1.4 cm \times 0.8–1.2 cm | | 6. <i>D. \times delicatum</i> |
| 8. Flowers with sepals more than 4 times as long as broad | | 7. <i>D. aemulum</i> |
| Flowers with sepals less than 4 times as long as broad | | 9 |
| 9. Midlobe of labellum recurved and with a long sharp point; almost always growing on <i>Nothofagus moorei</i> at high altitudes | | 8. <i>D. falcorostrum</i> |
| Midlobe of labellum decurved, not sharply pointed; usually found on rainforest trees at low to moderately high altitudes | | 10 |
| 10. Disc of labellum with 1 narrow keel commencing near base, terminating at about junction with midlobe | | 9. <i>D. \times gracillimum</i> |
| Disc of labellum with 3 parallel longitudinal keels from base to midlobe | | 10. <i>D. macropus</i> subsp. <i>gracilicaule</i> |

- | | |
|---|----------------------------|
| 11. Leaves short, not terete, always thick and rigid | 12 |
| Leaves long, terete, often extremely slender and pencil-like | 14 |
| 12. Stems chiefly aerial from tree branches; leaves thick but \pm flat, smooth, with a long sharp point | 11. <i>D. pugioniforme</i> |
| Stems creeping on rocks and trees; leaves thick, tuberculate or longitudinally furrowed | 13 |
| 13. Leaves with longitudinal raised tuberculate keels on upper surface, gherkin-like | 12. <i>D. cucumerinum</i> |
| Leaves with longitudinal grooves or furrows on upper surface | 13. <i>D. linguiforme</i> |
| 14. Leaves almost always erect regardless of angle of stem | 14. <i>D. schoeninum</i> |
| Leaves pendulous, or sometimes curved | 15 |
| 15. Leaves neither grooved nor furrowed; inflorescences of 1–15 flowers | 16 |
| Leaves generally grooved or furrowed; inflorescences of 1–4 flowers, usually 1 or 2 | 17 |
| 16. Flowers 1–4 per raceme, cream with heavy red stripes at base of sepals | 15. <i>D. fairfaxii</i> |
| Flowers up to 15 per raceme, white with narrow red or purple striations, or yellow | 16. <i>D. teretifolium</i> |
| 17. Sepals and petals recurved near apices; pedicels <i>ca</i> 0.5 cm long, filiform | 17. <i>D. mortii</i> |
| Sepals and petals not recurved near apices; pedicels 1–2 cm long | 18. <i>D. bowmanii</i> |

1. *Dendrobium monophyllum* F. Muell.

LILY OF THE VALLEY ORCHID

Dendrobium tortile Cunn.; *Callista monophylla* (F. Muell.) Kuntze

Epiphyte or lithophyte, often in large dense masses; pseudobulbs arising from creeping rhizome, erect, thick, \pm bluntly conical, 2.5–10 cm \times 1–3 cm, newer ones often completely covered with scarious sheathing bracts, older ones yellowish brown with persistent grooves and furrows. Leaves solitary, rarely 2, terminal, linear-oblong to oblong-elliptic, obtuse, tapered, 4–15 cm \times 0.5–1.5(–3) cm. Racemes solitary, terminal, erect, *ca* as long as leaf; pedicel including ovary 5–10 mm long; flowers 5–20, yellow, fragrant, bell-shaped, mentum broad, obtuse or truncate, *ca* 4 mm long; dorsal sepal ovate, acute, 5–7 mm \times 2.5–3.5 mm, free part of lateral sepals \pm triangular, 4–6 mm \times *ca* 2 mm; labellum *ca* 5–6 mm long, lateral lobes crescentic, small, midlobe broadly ovate, obtuse, *ca* 2.5 mm \times *ca* 3 mm, disc with 1–3 but usually 2 keels, broad, fused together for varying distances; column 2–3 mm long, apical teeth 1 per side, broadly triangular, very short, foot curved, 5–6 mm long. Fruits obovoid, *ca* 1.5 cm long.

Moreton, Wide Bay and Burnett districts, usually in or near rainforests on trees receiving plenty of light, on trees in open forest, or on rocks or cliffs often in full sunlight. Flowers mainly spring, but irregular.

2. *Dendrobium schneiderae* F. M. Bailey

Dendrobium schneiderae var. *major* Rupp

Epiphyte or lithophyte; pseudobulbs often densely matted, arising from slender creeping rhizome, \pm conical or ovoid, 0.8–2.5 cm \times 0.8–1.5 cm, newer ones partly covered by scarious bracts, older ones prominently grooved, yellowish, stouter. Leaves usually 2, often twisted, oblong-obovate, elliptic or narrowly oblong, apex obtuse, mucronate, base cuneate, 1.5–7 cm \times 0.5–0.8 cm. Racemes filiform, semipendulous, 5–17 cm long, pedicel including ovary (2–)4–10 mm long; flowers 4–25, pale greenish yellow, shiny, mentum curved, slender, *ca* 3–4 mm long; dorsal sepal ovate or elliptic, 4–5 mm \times 2–3 mm, free part of lateral sepals \pm obovate, *ca* 2.5 mm \times *ca* 3 mm; petals obovate, *ca* 3 mm \times *ca* 2 mm; labellum curved-erect, 5–6 mm long, lateral lobes extending full length of labellum, tapering up to *ca* 3 mm wide at apex, midlobe vestigial, disc dilated and truncate at apex with large raised callus plate, \pm obdeltoid apically, at base projected as slender keel to base of disc; column *ca* 1.5 mm long, apical teeth 1 per side, short, blunt, foot curved, 3–4 mm long.

Mainly coastal districts of the region on ranges, e.g. Springbrook, Mt Mistake, usually on branches of rainforest trees where there is good light penetration. Flowers summer–autumn.

3. *Dendrobium tetragonum* Cunn.**TREE SPIDER ORCHID**

Callista tetragona (Cunn.) Kuntze; *Dendrobium tetragonum* var. *variabilis* Gilbert

Epiphytes, usually in small clumps; stems semipendulous, slightly swollen basally then slender for considerable distance before becoming swollen and 4-angled, 6–45 cm × 0.5–1.5 cm. Leaves 2–5 near stem apex, thin, shiny, ovate to elliptic, acuminate, 3–10 cm × 1–3.2 cm. Racemes from leaf axils or almost apical, very short, pedicel including ovary 2–3 cm long; flowers 1–5, greenish yellow with irregular brown or red markings on margins, fragrance pronounced, vanilla-like, stellate; dorsal sepal erect, narrowly triangular, tapering to attenuate apex, 2–5 cm × 0.3–0.5 cm, lateral sepals deflexed, triangular at base, then linear, 2–5 cm × 0.3–0.5 cm; petals erect, curved, linear, 1.2–3.5 cm × ca 0.1 cm; labellum yellowish with various markings or rarely none, 1–1.4 cm × 0.8–3.3 cm when flattened, but ± curved throughout length, lateral lobes obliquely semicircular, 3–4 mm × 5–7 mm, midlobe usually ovate, deflexed, apiculate, disc with 3 low parallel keels extending whole length; column 4–5 mm long, foot 8–10 mm long. **Fig. 60D.**

Coastal districts on lowlands or ranges, usually growing on rainforest trees but also occasionally on *Melaleuca* spp. with papery bark growing in swamps. Flowers mainly spring, but erratic.

4. *Dendrobium kingianum* Bidw.**PINK ROCK ORCHID**

Dendrobium kingianum var. *pallidum* F. M. Bailey; *D. kingianum* subvar. *pallidum* Veitch; *Callista kingiana* (Bidw.) Kuntze; *D. kingianum* var. *silcockii* F. M. Bailey; *D. kingianum* var. *aldersoniae* F. M. Bailey

Lithophyte growing into large dense masses; stems broadest at base then tapering for varying distances to slender cylindrical apical part, without contracted part near base, stems freely producing aerial growths, 8–30 cm × 1–2 cm. Leaves 3–6, ovate to elliptic or narrowly so, bluntly acuminate, 3–14 cm × 0.8–2.5(–3.2) cm. Racemes 1–3, 7–15 cm long, pedicel including ovary 1–1.5 cm long; flowers 2–15, white through pink or lilac to deep red-mauve, sometimes segments white with pink, red or mauve markings, mentum very prominent; dorsal sepal oblong-triangular or oblong-ovate, obtuse, 0.9–1.6 cm × 0.4–0.7 cm, free part of lateral sepals triangular-falcate, 5–10 mm × 4–7 mm; petals narrowly obovate or narrowly elliptic, 0.8–1.4 cm × 0.2–0.4 cm; labellum 0.8–1.5 cm, lateral lobes starting near base, usually obliquely triangular, acute or blunt, 3–6 mm × 3–6 mm, midlobe transverse oblong to ± semicircular, decurved, mucronate, 3–5 mm × 5–10 mm, disc with single keel extending just onto midlobe, usually shallowly channelled, usually 3-dentate apically; column ca 3 mm long, dilated laterally about middle, apical margin crenulate, foot straight, 5–8 mm long. **Fig. 60B.**

Ranges of the region, on cliff faces or on rocks in open forest. Flowers mainly late winter–spring.

Hybrids between this species and *D. macropus* (Endl.) H. G. Reichb. ex Lindl. subsp. *gracilicaule* (F. Muell.) P. S. Green occur rarely in the McPherson Ra. This hybrid has been called *D. × suffusum* Cady.

5. *Dendrobium speciosum* Smith**KING ORCHID; ROCK ORCHID**

Epiphyte or lithophyte, sometimes growing into huge masses; stems 8–100 cm × (1)–2–6 cm, sometimes swollen throughout but usually with short swollen part at base then short slightly contracted part before main cylindrical slightly fusiform or slightly tapered stem, usually shallowly sulcate and partly covered in scarious sheathing bracts. Leaves 2–5 at top of stem, thick, leathery, oblong-ovate or oblong-elliptic, often concave above, obtuse, 4–25(–30) cm × 2–8(–15) cm. Racemes from leaf axils or ± terminal, 10–60 cm long, pedicel including ovary 2–5 cm long; flowers numerous, white to yellowish, with red or purple markings on labellum, mentum short, broad, thick, curved, ca 5 mm long; dorsal sepal linear-triangular, acute, 1.5–4 cm × 0.2–0.8 cm, free part of lateral sepals narrowly triangular, blunt, 1.5–3.5 cm × 0.5–1 cm; petals linear-acuminate, 1.5–3.5 cm × 0.1–0.4 cm; labellum 1.5–3 cm long when flattened, erect for short distance then curved through ca 90° and then straight, lateral lobes ± obliquely triangular, erect, incurved, obtuse, midlobe separated from rest by short neck, ± broadly ovate, mucronate, 0.5–1 cm ×

0.8–1.7 cm, disc with single keel not extending onto midlobe, wider near apex; column 4–8 mm long, apical teeth 1 per side, short, sharp, foot sharply curved, 5–10 mm long.

Two varieties occur in the region:

- | | |
|--|--|
| 1. Flowers 1.5–2.5 cm across, opening white, though sometimes turning cream or yellow with age | <i>D. speciosum</i> var. <i>hillii</i> |
| Flowers 3.5–5.5 cm across, opening deep yellow and remaining so | <i>D. speciosum</i> var. <i>grandiflorum</i> |

D. speciosum* var. *grandiflorum F. M. Bailey (*D. speciosum* var. *hillii* forma *grandiflorum* (F. M. Bailey) F. M. Bailey; *D. speciosum* forma *grandiflorum* (F. M. Bailey) H. G. Reichb.) is found in ranges in the north of the region, in rainforest. ***D. speciosum* var. *hillii*** F. M. Bailey (*D. hillii* J. D. Hook. non F. Muell.) has been recorded from the coastal districts and Great Dividing Ra., in a range of habitats. Flowers winter–spring.

6. *Dendrobium* × *delicatum* (F. M. Bailey) F. M. Bailey

Dendrobium speciosum Smith var. *delicatum* F. M. Bailey; *D. speciosum* var. *nitidum* F. M. Bailey; *D. kestevenii* var. *coloratum* Rupp

Lithophyte growing into large dense masses; stems broadest at base usually evenly tapered to moderately thick apex, 10–40 cm × 1–3 cm, partly covered by scarious remains of sheathing bracts, grooved. Leaves 2–6, coriaceous, narrowly oblong-elliptic, narrowly elliptic or narrowly ovate, tapered to obtuse tip, 5–21 cm × 1.2–3.5 cm. Racemes 1–3, 12–35 cm long, pedicel including ovary 2–4 cm long; flowers numerous, white or cream with or without pink or mauve blotches or suffusions, occasionally all pink or mauve, mentum prominent; dorsal sepal oblong to oblong-ovate, acute or obtuse, 1–1.8 cm × 0.4–0.6 cm, free part of lateral sepals ± triangular-falcate, 0.7–1.2 cm × 0.5–0.7 cm; petals narrowly oblong-elliptic, acute, 0.9–1.5 cm × 0.3–0.4 cm; labellum 0.9–1.4 cm when flattened, usually with short slender basal section before lateral lobes commence, lateral lobes mostly obliquely triangular, 3–5 mm × 4–6 mm, midlobe transversely oblong to semicircular, decurved, mucronate, usually minutely dentate apically, 6–9 mm long; column *ca* 3–4 mm long, foot forward-curving, 6–8 mm long.

Darling Downs and Moreton districts, growing on rocks or cliff faces in open forest country on ranges. Flowers late winter–spring.

This taxon is considered to be a natural hybrid with *D. kingianum* Bidw. and *D. speciosum* Smith var. *hillii* F. M. Bailey as parents.

7. *Dendrobium aemulum* R. Br.

BOX ORCHID; IRONBARK ORCHID

Callista aemula (R. Br.) Kuntze

Epiphytes usually in only small clumps; stems straight or curved, usually thin and terete and up to 20–30 cm × 0.8–1 cm in or near rainforest, but sometimes short and relatively thick and up to 7 cm × 1 cm when epiphytic on ironbarks, all with stems slightly swollen at base, narrowed for short distance then dilating and cylindrical for remainder, shallowly sulcate in dry weather. Leaves 2–4 at top of stem, thick and firm, ovate to elliptic, acute, base cuneate, 3–8.5 cm × 0.8–2.5 cm. Racemes up to 10 cm long, pedicels including ovary 1–1.8 cm long; flowers white or pale cream with some purple markings on labellum, mentum broad, curved, 3–4 mm long; dorsal sepal linear-triangular, 1.5–3.3 cm × 0.15–0.35 cm, free part of lateral sepals linear-triangular, deflexed, 1.5–2.5 cm × 0.2–0.4 cm; petals linear-subulate, 1.5–3 cm × 0.1–0.2 cm; labellum *ca* 7 mm long when flattened, erect near base then decurved through *ca* 180°, narrow near base before lateral lobes commence, lateral lobes crescentic, *ca* 2 mm × *ca* 4 mm, anterior part narrowly dentate, midlobe ovate, acute or obtuse, usually somewhat constricted near apex, *ca* 3 mm × *ca* 3 mm, disc with 3 straight low parallel keels, central one extending onto and almost full length of midlobe, here sinuate and topped by yellow crenate crest; column *ca* 2 mm long, foot curved, *ca* 4 mm long. Capsules ellipsoid to obovoid, *ca* 1.5 cm long. **Fig. 60A.**

Coastal districts on lowlands or ranges, either on rainforest trees or *Lophostemon confertus* trees adjoining rainforest, or on ironbarks. Flowers winter–spring.

8. *Dendrobium falcorostrum* Fitzg.

BEECH ORCHID

Callista falcorostris (Fitzg.) Kuntze

Epiphyte or occasionally lithophyte, growing into huge densely packed masses; stems 15–50 cm × usually 1–1.5 cm, usually slightly swollen at base, contracted for short distance, then dilated into slender cylindrical ribbed yellowish green stem, rarely stem short, thick, fusiform. Leaves 2–5 per stem, distichous, coriaceous, ovate to elliptic, blunt, base cuneate, 6–14 cm × 2.5–3 cm. Racemes 1–4, 8–16 cm long, pedicel including ovary 1.5–3 cm; flowers 4–20, white with yellow and purple markings on labellum, mentum shallow but broad; dorsal sepal oblong-ovate, slightly falcate, 1.5–3 cm × 0.8–1.5 cm; petals narrowly oblong-elliptic, 2–3.5 cm × 0.5–1 cm; labellum *ca* 1.5–3.5 cm when flattened, lateral lobes commencing at base, ± obliquely triangular, 2–3 mm × *ca* 5 mm, midlobe attached on broad base, at first decurved and ± transverse-oblong, then rapidly constricted to a recurved acuminate tip, disc with short high keel deeply bifid apically, arms divergent; column *ca* 3 mm long, foot forward-curving, very broad, *ca* 7 mm long.

McPherson Ra. at high altitudes, almost always found on *Nothofagus moorei*. Flowers late winter–spring.

9. *Dendrobium* × *gracillimum* (Rupp) Rupp

Dendrobium speciosum Smith var. *gracillimum* Rupp; *D. speciosum* var. *bancroftianum* H. G. Reichb.; *D. speciosum* var. *hillii* Masters forma *bancroftianum* (H. G. Reichb.) F. M. Bailey; *D. × gracilosum* Clemesha

Epiphyte or lithophyte; stems swollen at base then contracted for short distance before dilating to main slender cylindrical part. Leaves 3–5, oblong-ovate to oblong-elliptic, somewhat recurved, blunt, 8–20 cm × 1.5–3.5 cm. Racemes 1–3, 10–25 cm long, pedicel including ovary 1.5–3 cm long; flowers 12–many, white, cream or greenish yellow with reddish or purplish spots or bars on labellum, mentum variable; dorsal sepal oblong-ovate, obtuse, 1.2–1.8 cm × 0.3–0.4 cm, free part of lateral sepals narrowly falcate-triangular, 6–10 mm × 3–4 mm; petals narrowly oblong to linear-oblong, decurved, obtuse, 1–1.5 cm × 0.1–0.2 cm; labellum *ca* 6–10 mm long when flattened, lateral lobes starting from base, ± obliquely triangular, apex rounded, 2–3 mm × 4–6 mm, midlobe transverse-oblong to semicircular, sides upcurved, point deltoid, decurved, apiculate, 3–4 mm × 5–7 mm, disc with single slender keel tapered to both ends, ending about junction of midlobe; column *ca* 3 mm long, apical margin slightly crenulate, foot *ca* 5 mm long.

Recorded from Moreton district, also further north, apparently preferring rainforest trees as hosts. Flowers late winter–spring.

This taxon is a natural hybrid with *D. macropus* (Endl.) H. G. Reichb. ex Lindl. subsp. *gracilicaule* (F. Muell.) P. S. Green and *D. speciosum* Smith as parents.

10. *Dendrobium macropus* (Endl.) H. G. Reichb. ex Lindl. subsp. *gracilicaule* (F. Muell.) P. S. Green

Dendrobium gracilicaule F. Muell.; *D. elongatum* Cunn. non Lindl.; *D. brisbanense* H. G. Reichb.; *Callista gracilicaulis* (F. Muell.) Kuntze

Slender epiphyte or occasionally lithophyte, growing into clumps with numerous stems; stems swollen basally, contracted for short distance then gradually dilating and remainder cylindrical, 20–60 cm × 0.5–1 cm. Leaves 3–6, crowded near stem apex, narrowly ovate, acute, or often obscurely bifid, 3.5–15 cm × 0.8–2(–4) cm. Racemes 5–12 cm long, pedicels including ovary 0.7–2 cm long; flowers 5–30, dull yellow usually with red-brown blotching on outside of sepals, mentum thick, curved, truncate or blunt, 3–4 mm long; dorsal sepal ± oblong to oblong-ovate, obtuse, 0.7–1.2 cm × 0.3–0.5 cm, free part of lateral sepals oblong-ovate, falcate, 7–10 mm × 3–5 mm; petals narrowly oblong-obovate, 7–10 mm × 1.5–2 mm; labellum 7–8 mm long when flattened, upright near base then curved through *ca* 180°, lateral lobes obliquely triangular, acute, *ca* 2 mm × *ca* 4 mm, midlobe ± reniform, *ca* 2 mm × *ca* 4 mm; disc with 3 parallel keels extending from base to just onto midlobe then 2 outside ones diverging; column *ca* 3 mm long, apical teeth 1 per side, small, blunt, foot curved, *ca* 5 mm long.

Widespread in the coastal districts and Great Dividing Ra., e.g. Bunya Mts, east of Killarney, Lamington Plateau and Mt Tamborine, usually on rainforest trees at low or high altitudes; very common. Flowers winter–spring.

Hybrids between this species and *D. kingianum* Bidw. occur rarely in the McPherson Ra. This hybrid has been called *D. × suffusum* Cady.

11. *Dendrobium pugioniforme* Cunn.

DAGGER ORCHID

Dendrobium pungentifolium F. Muell.; *Callista pugioniformis* (Cunn.) Kuntze

Epiphyte or lithophyte, growing into large pendulous masses; stems slender, up to 2 m long, intricately branching. Leaves numerous, thick, ovate or oblong-ovate, \pm flat, acuminate, pungent pointed, base rounded, 1–7 cm \times 0.5–2 cm. Racemes very short, pedicel including ovary 5–10 mm long; flowers 1–3, light green with bright purple or red markings on labellum, mentum 3–5 mm long; dorsal sepal oblong-ovate, acuminate, 0.8–1.4 cm \times 0.25–0.4 cm, free part of lateral sepals oblong-triangular, 0.9–1.5 cm \times 0.3–0.5 cm; petals narrowly oblong-ovate, acuminate, 0.8–1.4 cm \times 0.15–0.25 cm; labellum 1.3–1.9 cm long when flattened, lateral lobes \pm broadly triangular, \pm obtuse, midlobe recurved, \pm deltoid with elongated apex, margin deeply sinuate-undulate, 4–5.5 mm \times 5–7 mm, disc with 3 parallel keels extending onto midlobe where they are sinuate and undulate; column *ca* 4 mm long, apical margin of column with 1 prominent tooth per side, foot 4–5 mm long.

Moreton and Darling Downs districts on ranges, e.g. Cunninghams Gap, Lamington National Park. Flowers spring.

12. *Dendrobium cucumerinum* MacLeay ex Lindl.

CUCUMBER ORCHID; GHERKIN ORCHID

Callista cucumerinum (MacLeay ex Lindl.) Kuntze

Usually epiphyte, rhizomes 15–25 cm long, of 2–5 internodes usually with scarious remains of sheathing bracts, with prominent ribs and annular scars. Leaves terminal, obloid-ovoid or ellipsoid, very obtuse, 1.5–3.5 cm \times 0.7–1.3 cm diameter, surface with longitudinal raised tuberculate keels. Racemes 2–4 cm long, pedicels *ca* 7–10 mm long; flowers 2–10, cream, segments pale yellow or greenish white with 3–5 reddish purple striae in lower half, mentum prominent, directed backwards, 3–4 mm long; dorsal sepal narrowly triangular-oblong, blunt, 1.5–2 cm \times 0.25–0.4 cm, free part of lateral sepals beyond mentum triangular-falcate, 1.2–1.7 cm \times 0.3–0.4 cm; petals linear-elliptic-oblong, 1.4–2 cm \times 0.15–0.25 cm; labellum 1–1.4 cm long when flattened, 3-lobed, lateral lobes commencing 3–4 mm from base, incurved, obliquely transversely oblong, *ca* 1 mm \times *ca* 3 mm, midlobe decurved through *ca* 90°, ovate or triangular, usually acute, margin undulate, crisped, disc with 3 straight parallel keels extending onto midlobe, central almost to apex, undulate sinuate and dark coloured on midlobe; column 3–3.5 mm long, apical margin denticulate or crenulate, foot 3–4 mm long.

Moreton and Darling Downs districts in valleys in ranges, e.g. Mt Lindesay foothills and Bunya Mts, host almost exclusively *Casuarina cunninghamiana*. Flowers late spring–summer.

13. *Dendrobium linguiforme* Swartz

TICK ORCHID; TONGUE ORCHID

Callista linguiformis (Swartz) Kuntze; *Dendrobium linguiforme* var. *huntianum* Rupp

Epiphyte or lithophyte growing into large patches; rhizomes branching, 10–40 cm long, usually covered in sheathing bracts or their scars. Leaves closely spaced, numerous, \pm prostrate, usually alternate on rhizome, oblong-ovate, oblong or obovate, obtuse, 1.5–4 cm \times 0.7–1.5 cm \times 0.4–0.6 cm thick, longitudinally furrowed above but not tuberculate. Racemes 5–15 cm long, pedicel including ovary 0.8–1.7 cm long; flowers 6–10, usually reversed, white or cream with faint purple markings on labellum, mentum *ca* 2 mm long; dorsal sepal very narrowly triangular, acute, 1.2–2.2 cm \times 0.1–0.3 cm, free part of lateral sepals very narrowly triangular, acute, 1–2 cm \times 0.1–0.15 cm; labellum 5–6 mm long when flattened, curved almost into a circle, lateral lobes erect, crescent-shaped, *ca* 1 mm \times *ca* 4 mm, midlobe \pm ovate but constricted near acute apex, margin usually undulate, *ca* 2 mm \times *ca* 2 mm, disc with 3 parallel keels extending *ca* $\frac{2}{3}$ length of midlobe, there sinuate; column *ca* 2 mm long, apical teeth very short, truncate, emarginate, foot curved, *ca* 3 mm long.

Coastal areas and ranges of Moreton, Darling Downs, Burnett and Wide Bay districts, e.g. Bunya Mts. Flowers late winter–spring.

14. *Dendrobium schoeninum* Lindl.**PENCIL ORCHID**

Dendrobium striolatum H. G. Reichb. var. *beckleri* (F. Muell.) F. M. Bailey; *Callista beckeri* (F. Muell.) Kuntze; *D. beckeri* F. Muell.; *D. striolatum* auct. non H. G. Reichb., F. M. Bailey

Epiphyte up to 90 cm long, usually much smaller, erect when short, \pm pendulous or drooping when long; stem segments 1–15 cm \times 0.1–0.8 cm. Leaves almost always upright regardless of stem angle, terete, 2–16 cm \times 0.2–1.2 cm, deeply grooved. Racemes short, pedicel including ovary 1–2.5 cm long; flowers 1–4, white, pale cream, or pale mauve, with dark purple stripes on segments and purple margin on midlobe, mentum 6–9 mm long; dorsal sepal very narrowly oblong-triangular, acute, 1.3–2.5 cm \times 0.25–0.4 cm, free part of lateral sepals narrowly oblong-triangular, acute, 1.4–2.5 cm \times 0.3–0.4 cm; petals linear-oblong, acute, 1.2–2.2 cm \times 0.1–0.2 cm; labellum 2–3 mm long when flattened, lateral lobes not extending to base, obliquely triangular, ca 0.2 cm \times 1–1.3 cm, free anterior part prominent, tooth-like, midlobe \pm ovate, long acuminate, margin deeply sinuate, undulate, 7–10 mm \times 5–7 mm, disc with 3 parallel keels, central one often not reaching base, all 3 extending well into midlobe, tightly sinuate in distal third; column 4–5 mm long, apical teeth usually vestigial, foot slender, 7–9 mm long.

Usually coastal districts and ranges, e.g. Bunya Mts, usually on trees where it receives a fair light intensity. Flowers late winter–spring.

15. *Dendrobium fairfaxii* F. Muell. & Fitzg.

Dendrobium teretifolium R. Br. var. *fairfaxii* (F. Muell. & Fitzg.) F. M. Bailey; *Callista fairfaxii* (F. Muell. & Fitzg.) Kuntze

Pendulous epiphyte up to 3 m long; stem segments straight, 5–15 cm \times ca 0.4 cm. Leaves pendulous, dark green, terete, 30–70 cm \times ca 0.25 cm, not grooved. Racemes 1.5–3 cm long, pedicel including ovary 1.3–2.5 cm long; flowers 1–4, cream to yellowish with prominent red stripes at base of sepals, mentum 3–5 mm long; dorsal sepal linear-triangular, acute, 2–2.5 cm \times ca 0.3 cm, free part of lateral sepals narrowly triangular, acute, 2.5–3 cm \times ca 0.4 cm; petals linear-subulate, acute, 2.5–3 cm \times ca 0.1 cm; labellum 2.5–3 cm long when flattened, curved, lateral lobes crescentic, ca 1.5 mm \times ca 5 mm, midlobe narrowly ovate, apex filiform, margin sinuate, disc with 3 parallel keels extending well onto midlobe where they are sinuate; column ca 2 mm long, foot ca 2–3 mm long.

Possibly occurring on McPherson Ra. and Bunya Mts at high elevations. Flowers spring.

16. *Dendrobium teretifolium* R. Br.**BRIDAL VEIL ORCHID**

Pendulous epiphyte or lithophyte up to 3 m long, usually much shorter; stem segments 5–15 cm \times 0.1–0.4 cm. Leaves pendulous, terete, 10–60(–70) cm \times (0.15–)0.3–2 cm, not grooved. Racemes 4–10 cm long, pedicel including ovary 1.3–2.8 cm long; flowers few–15, white, cream or pale yellow with a few short red or purple striations on outside of sepals, dotted on labellum, mentum 3–5 mm long; dorsal sepal linear-triangular, acute, 2–4 cm \times 0.2–0.3 cm, free part of lateral sepals narrowly triangular, acute, 2–4 cm \times 0.3–0.4 cm; petals linear-subulate, acute, 1.8–4 cm \times 0.1–0.2 cm; labellum 2–4 cm long when flattened, but curved through ca 90° at about middle, midlobe decurved also, lateral lobes \pm crescentic, ca 1.5 mm \times ca 5–8 mm, midlobe narrowly ovate, apex filiform, margin sinuate, undulate, disc with 3 parallel keels extending well onto midlobe where they are sinuate; column 2–2.5 mm long, foot 3–5 mm long. Capsules obovoid, ca 1.5 cm long.

Two varieties occur in the region:

1. Stems flexuose; leaves up to 60 cm \times 0.3–1 cm; filiform apex of labellum short; flowers white; plants of open situations and low altitudes

D. teretifolium var.
teretifolium

- Stems straight; leaves up to 70 cm \times 0.15–0.3 cm; filiform apex of labellum elongated; flowers yellow; plants of rainforests or open forests

D. teretifolium var. *aureum*



Fig. 60 ORCHIDACEAE — A-D *Dendrobium* spp. — A₁-A₂ *D. aemulum*, A₁ habit x $\frac{1}{3}$, A₂ flower x $1\frac{1}{2}$; B₁-B₂ *D. kingianum*, B₁ habit x $\frac{1}{3}$, B₂ flower x $1\frac{1}{2}$; C *D. mortii*, habit x $\frac{1}{2}$; D₁-D₂ *D. tetragonum*, D₁ habit x 1; D₂ flower x $1\frac{1}{2}$.

D. teretifolium var. **teretifolium** (*Callista teretifolia* (R. Br.) Kuntze) usually grows at low altitudes in coastal districts where there is good light penetration. **D. teretifolium** var. **aureum** F. M. Bailey is common in coastal districts on rainforest trees at moderate to high altitudes. Both flower winter-spring.

17. *Dendrobium mortii* F. Muell.

Dendrobium tenuissimum Rupp; *D. robertsonii* F. Muell. ex Rupp; *Callista mortii* (F. Muell.) Kuntze

Extremely slender pendulous epiphytes; stems very fine, branches 1–4 cm \times ca 0.1 cm diameter. Leaves pendulous, cylindrical, 1.5–9 cm \times 0.2–0.4 cm, finely grooved. Racemes very short, pedicel including ovary 4–8 mm long; flowers solitary or sometimes 2 or 3, mentum ca 4–5 mm long; sepals purplish brown or dark or pale green, dorsal sepal \pm oblong-ovate, acute, sinuate, 1–1.5 cm \times 0.2–0.3 cm, free part of lateral sepals narrowly triangular-falcate, 1–1.5 cm \times 0.3–0.4 cm; petals green, \pm linear-elliptic, 0.8–1.4 cm \times 0.1–0.2 cm; labellum white with yellowish green keels and purple blotches at apex of disc, ca 1.2–1.7 cm when flattened, lateral lobes obliquely transversely oblong, ca 2 mm \times 6–8 mm, midlobe revolute, almost circular, apiculate, margin crisped, disc with 3 parallel keels extending onto midlobe, central one extending to apex, all slightly sinuate in distal third of disc; column 4–5 mm long, apical margin crenulate, foot 4–5 mm long. Capsules ellipsoid, ca 2 cm long. **Fig. 60C.**

Moreton district on ranges on rainforest trees; most common at high altitudes. Flowers spring.

18. *Dendrobium bowmanii* Benth.

Dendrobium mortii auct. non F. Muell.

Epiphyte up to ca 60 cm long, \pm pendulous; stem branches 2–10 cm \times 0.1–0.4 cm. Leaves \pm cylindrical or terete, sometimes curved, 2–15 cm \times 0.1–0.4 cm, shallowly grooved. Racemes short, pedicel including ovary 1–1.5 cm long; flowers 1–4, usually 2, pale green, cream, yellow or pale brown with 3–5 red stripes, and white labellum, mentum 6–8 mm long; dorsal sepal oblong-obovate, acute to blunt, 0.8–1.5 cm \times 0.3–0.5 cm, free part of lateral sepals \pm oblong, acute to blunt, 0.8–1.3 cm \times 0.25–0.5 cm; petals narrowly obovate to narrowly oblong-obovate, acute, 0.8–1.2 cm \times 0.15–0.25 cm; labellum 1.3–2 cm \times 0.4–0.6 cm when flattened, disc straight, midlobe revolute, lateral lobes \pm obliquely transversely oblong, free part prominent, tooth-like, ca 1.5 mm \times 5–7 mm, midlobe squarish, apex rounded apiculate, margin crisped, crenulate, 3–5 mm \times 3.5–6 mm, disc with 3 parallel keels extending onto midlobe and sinuate on it, centre one longest; column ca 7 mm long, apical teeth 2 per side, anterior ones half as high as anther, posterior ones shorter, \pm bifid, foot ca 7 mm long. Capsules obovoid, 1.2–1.5 cm long.

Mainly coastal districts in rainforest or depauperate rainforest but also Burnett and Darling Downs districts in depauperate rainforest, apparently preferring trees where exposed to a moderate light intensity. Flowers summer-autumn, often again in spring.

43. TAENIOPHYLLUM Blume

Leafless monopodial epiphytes with extremely short stems; roots green or greyish green, apparently performing the function of leaves, rather long, round, triangular or flattened in cross section. Inflorescences usually bearing flowers in succession 1–few at a time, rachis elongating as flowers develop, glabrous or pubescent; flowers small, sepals and petals either quite free or united at their bases to form a tube; labellum immovably attached to base of column by top of spur, entire or 3-lobed, spurred at rear, apex of midlobe sometimes produced into filiform appendage, spur without calli, globular, conical, cylindrical or clavate; column very short, at least partly concealed within labellum; anther with long or short rostrum, pollinia 3, all quite free, stipe long or short; viscidium oblong, elliptic or circular.

120 species, tropical Africa to Japan and Tahiti, and Australasia; 5 species Australia; 1 species south-eastern Queensland.

1. *Taeniophyllum muelleri* Benth.

Taeniophyllum wilkianum Hunt; *T. cymbiforme* Hunt

Tiny plant; roots ± circular in cross-section, *ca* 1 mm diameter, often proliferating from apex to form clonal colonies. Racemes 0.5–2.5 cm long, pedicel including ovary *ca* 1 mm long, subtending bract acute, *ca* 0.5 mm long; flowers 2–8, pale green, yellowing with age; sepals and petals similar, triangular or somewhat ovate, acute, 1–2.5 mm long (without spur), united for *ca* ½ their length; labellum *ca* as long as or slightly shorter than perianth segments, somewhat boat-shaped, apex incurved, acute, with filiform or very slender appendage *ca* 0.25 mm long, appendage translucent, brittle, spur ± globular or cylindrical, obtuse, 0.5–1 mm × 0.5–0.75 mm; column *ca* 0.5 mm long, winged apically, wings ± oblong, obtuse, incurved in front of stigma. Capsules cylindrical, often curved, 7–*ca* 10 mm long. **Fig. 61A.**

Coastal districts and ranges, mainly growing along streambanks on outer twigs of trees and shrubs. Flowers mainly winter–spring.

44. BULBOPHYLLUM Thouars

Sympodial epiphytes with creeping rhizome usually covered with thin scarious sheathing bracts. Leaves solitary or two together on small pseudobulbs. Inflorescences arising from base of pseudobulbs or from node of rhizome, various, or flowers solitary; sepals erect, free, lateral sepals obliquely dilated at base and connate with basal projection of column to form mentum; petals usually smaller than sepals; labellum articulate at base of column, usually thick and ± ligulate, with poorly developed lateral lobes, surface sometimes warty or hairy; column short, usually with 2 very pronounced ± erect horn-like teeth, foot usually curved forward away from mentum, then upcurved to form pedestal on which labellum hinges; anther 2-locular, pollinia 4 in 2 pairs, each pair with ± equal or ± united pollinia, without caudicles or stipes.

900 species tropical and southern temperate regions; 25 species Australia; 9 species south-eastern Queensland.

- | | | | | | | |
|--|---|---|---|---|---------------------------|---|
| 1. Leaves linear-triangular or narrowly ovate, 1–1.5 mm long, on disc-like or globose pseudobulbs 1–3 mm diameter | . | . | . | . | . | 2 |
| Leaves more than 8 mm long, pseudobulbs usually more than 3 mm diameter | . | . | . | . | . | 3 |
| 2. Pseudobulbs disc-like, flattened; flower peduncle ± pedicel <i>ca</i> 0.3 cm long | | | | | 1. <i>B. minutissimum</i> | |
| Pseudobulbs ± globular or ovoid; flower peduncle ± pedicel <i>ca</i> 0.8–1.5 cm long | . | . | . | . | 2. <i>B. globuliforme</i> | |
| 3. Pseudobulbs grooved or furrowed, often undulate or tuberculate on ridges | . | . | . | . | . | 4 |
| Pseudobulbs not grooved nor furrowed, usually ovoid or globular though sometimes irregularly shaped due to crowding | . | . | . | . | . | 6 |
| 4. Pseudobulbs usually well spaced along branched rhizome, ± ovoid, 4–10 mm × 3–8 mm; bracts subtending flowers 0.5–1 mm long | | | | | 3. <i>B. exiguum</i> | |
| Pseudobulbs close together or closely appressed on rhizome, ovoid to depressed globular, 1.5–3 cm × 1–2 cm or 0.7–1.2 cm diameter; bracts subtending flowers 2–5 mm long | . | . | . | . | . | 5 |
| 5. Pseudobulbs ± ovoid, 1.5–3 cm × 1–2 cm; lateral sepals 1.4–2.6 cm long | | | | | 4. <i>B. elisae</i> | |
| Pseudobulbs ± depressed globular to ovoid, 0.7–1.2 cm diameter; lateral sepals 0.3–0.4 cm long | . | . | . | . | 5. <i>B. bracteatum</i> | |
| 6. Pseudobulbs usually well spaced along rhizome, usually at least 1–3 internodes between pseudobulbs | . | . | . | . | . | 7 |
| Pseudobulbs close together or crowded, often irregularly shaped from crowding | . | . | . | . | . | 9 |

- | | | |
|---|--------------------------|---|
| 7. Pseudobulbs partly obscured by scarious bracts; surface of labellum papillose, margin usually finely ciliate; flowers orange | 6. <i>B. aurantiacum</i> | 8 |
| Pseudobulbs without obscuring bracts; surface of labellum smooth; flowers never orange | | |
| 8. Pseudobulbs 2–3 mm × 2–3 mm; flowers solitary, usually reversed, white with yellow tips; labellum ovate, ca 2 mm long | 7. <i>B. shepherdii</i> | |
| Pseudobulbs 4–10 mm × 3–8 mm; flowers few, not reversed, cream-white; labellum ligulate, 3.5–4 mm long | 3. <i>B. exiguum</i> | |
| 9. Pseudobulbs 0.4–0.7 cm × 0.2–0.4 cm; flowers few, small, translucent-white; labellum 2.5–3 mm long | 8. <i>B. argyropus</i> | |
| Pseudobulbs 0.8–2 cm × 0.5–1.5 cm; flowers solitary, large, cream, blotched; labellum ca 6–9 mm long | 9. <i>B. weinthalii</i> | |

1. *Bulbophyllum minutissimum* (F. Muell.) F. Muell.

Dendrobium minutissimum F. Muell.; *Bulbophyllum moniliforme* F. Muell.; *Phyllorchis minutissima* (F. Muell.) Kuntze

Epiphyte or lithophyte, growing into extensive masses; pseudobulbs dark green or often suffused with red, orbicular, flattened, disc-like, 2–3 mm diameter. Leaves ephemeral, narrowly ovate, acuminate, margin incurved, 1–1.5 cm long. Flowers solitary, peduncle, pedicel and ovary totalling ca 3 mm long, pedicel sparsely tuberculate, ovary coarsely hairy, mentum ca 1.5 mm long; sepals whitish with 3 broad red stripes, opening fairly widely, dorsal sepal ovate, cucullate, 2–3 mm × ca 2 mm, laterals dilated basally, ca 2–3 mm × ca 2 mm; petals whitish with 1 broad red stripe, narrowly ovate, ca 1.5 mm × ca 1.5 mm; column ca 1 mm long, wings not very well developed, foot forward curving, ca 1.5 mm long. Capsules ellipsoid to obovoid, 3–4 mm long, ribbed, with coarse hairs. **Fig. 61D.**

Moreton district northwards, usually lowlands or near-coastal ranges, but also recorded from eastern Burnett district, apparently usually not in rainforest, often on rocks. Flowers spring.

2. *Bulbophyllum globuliforme* Nicholls

Epiphyte, growing into extensive masses; pseudobulbs usually green, ± globular or ovoid, 1–2 mm diameter. Leaves ephemeral, linear-triangular, 1–1.5 mm long. Flowers solitary, peduncle, pedicel and ovary totalling 0.8–1.5 cm long, ovary and pedicel glandular-tuberculate; flowers white or cream, sometimes suffused with pale yellow or rarely crimson on sepals, labellum pale yellow, mentum ca 1 mm long; sepals opening fairly widely, dorsal sepal ovate, 2.5–3 mm × ca 1 mm, laterals dilated at base then ovate, tapered, 2.5–3 mm × ca 1.5 mm; petals narrowly ovate, 2–2.5 mm × ca 0.5 mm; labellum ± oblong or linguiforme, apex obtuse, 1.5–2 mm × ca 1 mm; column ca 0.5 mm long, foot slightly curving, ca 1 mm long.

McPherson Ra., also Maleny and Noosa areas of the Wide Bay district, apparently only growing on trunks and branches of *Araucaria cunninghamii*. Flowers mainly spring.

3. *Bulbophyllum exiguum* F. Muell.

Dendrobium exiguum (F. Muell.) F. Muell.; *Bulbophyllum exiguum* var. *dallachyi* Benth.; *Phyllorchis exigua* (F. Muell.) Kuntze

Epiphyte or lithophyte, sometimes forming huge mats; pseudobulbs usually well spaced along branched rhizome, globular or ovoid, usually grooved or angular, rugose, particularly when dry, 3–10 mm × 3–8 mm. Leaves very shortly petiolate; blades oblong, oblong-obovate or elliptic, acute or mucronate, base contracted, margin recurved, (0.8–)1.5–5 cm × (0.3–)0.5–0.9 cm, thin, midrib prominent below. Racemes few-flowered, pedicel including ovary 5–7 mm long, subtending bract acute, 0.5–1 mm long; flowers pale green to creamy white, widely opening, mentum ca 2 mm long; dorsal sepal narrowly ovate to ovate, acute or blunt, 4–6 mm × 1.3–2 mm, laterals auriculate at base then contracted to triangular, ca 4–5 mm × 2–2.5 mm; petals ovate to ovate-oblong, obtuse, 2.5–3.5 mm × ca 1.5 mm; labellum attached to column foot by slender claw, ± oblong or ligulate, margin somewhat downcurved, 3.5–4 mm × 1–1.5 mm; column ca 9 mm long, teeth prominent, foot curved, ca 2 mm long. Capsules ellipsoid, ca 1 cm long.

Widespread in both low and high altitude rainforest, but also on sandstone. Flowers mainly autumn.

4. *Bulbophyllum elisae* (F. Muell.) Benth.*Cirrhopetalum elisae* F. Muell.

Epiphyte or occasionally lithophyte; pseudobulbs close together on rhizome but not excessively crowded, \pm ovoid, 1.5–3 cm \times 1–2 cm, deeply grooved, ridges several, undulate or tuberculate. Leaves narrowly oblong to elliptic, acute, base cuneate to tapered, 2–11 cm \times 0.8–1.5 cm, midrib prominent. Racemes (3.5–)8–25 cm long, pedicel including ovary 0.6–1(–2) cm long, subtending bract acute, 3–5 mm long; flowers 3–12, green or yellowish or rarely reddish purple or tinged with pink, labellum dark red or purple, mentum shallow, *ca* 2 mm long; dorsal sepal ovate, long acuminate, 6–8 mm \times 1.5–3 mm, lateral sepals ligulate to narrowly triangular, apex tapered, 1.4–2.6 cm \times 0.2–0.4 cm; petals ovate to elliptic-oblong, obtuse or blunt, 2.5–4 mm \times *ca* 1.5 mm; labellum attached by very short slender claw, \pm ovate or oblong, obtuse, 2.5–3.5 mm \times 1–1.5 mm; column *ca* 1.5–2 mm long, foot \pm at right angles, *ca* 1.5–2 mm long.

High altitude ranges of the region, e.g. Mt Mistake, Bunya Mts, Girraween National Park, usually on rainforest trees, sometimes on rocks. Flowers usually late autumn to spring, erratic.

5. *Bulbophyllum bracteatum* (Fitzg.) F. M. Bailey*Adelopetalum bracteatum* Fitzg.

Epiphyte or occasionally lithophyte; pseudobulbs usually closely appressed to each other along rhizome, glossy yellowish to dark green, depressed globular to ovoid, 0.7–1.2 cm diameter, usually deeply grooved longitudinally, surfaces of ridges uneven. Leaves very shortly petiolate; blades oblong-elliptic to oblong-obovate, acute, 1.5–3 cm \times 0.7–1.2 cm, rather thin, coriaceous. Inflorescences racemose, 5–10 cm long, pedicel including ovary *ca* 2 mm long, bract acuminate, 2–4 mm long; flowers up to 25, cream or yellow, densely mottled with purple, margin cream or white, widely opening; dorsal sepal ovate, shallowly concave, acute, 3–4 mm \times 2–2.5 mm, lateral sepals \pm triangular or deltoid, acute, 3–4 mm \times *ca* 2.5–3 mm; petals narrowly ovate to narrowly triangular, blunt, *ca* 2 mm \times *ca* 0.75 mm; labellum ligulate, thick, 1.5–2 mm \times 0.7–1 mm, attached to hook on apex of column foot by short claw; column *ca* 1 mm long, foot hooked apically, *ca* 1.5 mm long.

Medium to high altitude areas of the southern districts, e.g. Mt Tamborine, Mt Mistake, Springbrook, Killarney area. Flowers spring.

6. *Bulbophyllum aurantiacum* F. Muell.*Dendrobium aurantiacum* (F. Muell.) F. Muell.; *Phyllorchis aurantiacum* (F. Muell.) Kuntze

Epiphyte or occasionally lithophyte, usually pendulous; rhizomes up to 40 cm long, *ca* 2–3 mm diameter, 1–3 internodes between pseudobulbs; pseudobulbs erratically spaced, cylindrical to globular, apices depressed, usually decumbent and partly obscured by scarious bracts, 3–8 mm \times 2–4 mm, scarious bracts broad, apiculate, 0.6–*ca* 1.2 cm long, ribbed, disintegrating with age but often ribs persistent. Leaves often thick, elliptic, oblong or oblong-obovate, or narrowly so, channelled, apex acute, base cuneate to tapered, 1.5–10 cm \times 0.4–2.5 cm. Peduncles solitary or clustered, peduncle, pedicel and ovary *ca* 3–4 mm long; flowers usually cream or pale green at base, remainder usually red or orange, not widely opening, mentum very shallow, 1–1.5 mm \times *ca* 0.5 mm; dorsal sepal ovate, blunt, often margin inrolled, 3–7 mm \times 1–3 mm, lateral sepals connate, ovate, falcate, expanded basally, 3–7 mm \times 1.5–2 mm; petals oblong or ovate, obtuse, 1–3 mm \times 0.7–2 mm; labellum brown, ovate, curved, sides slightly upcurved, margin usually finely ciliate, *ca* 1.5–2 mm \times *ca* 1 mm, surface papillose; column including foot 1.5–2 mm long. Capsules ellipsoid to obloid-obovoid, *ca* 7–10 mm long.

Coastal districts, low or higher altitudes, epiphyte of closed forest or lithophyte in well shaded gorges. Flowers mainly autumn to spring.

7. *Bulbophyllum shepherdii* (F. Muell.) F. Muell.*Dendrobium shepherdii* F. Muell.; *D. crassulifolium* Cunn.; *Bulbophyllum crassulifolium* (Cunn.) Rupp; *B. shillerianum* H. G. Reichb.; *Phyllorchis shepherdii* (F. Muell.) Kuntze

Lithophyte or epiphyte, creeping, usually growing into extensive matted clumps; rhizomes

with 2 or 3 internodes between pseudobulbs, pseudobulbs depressed globular or ovoid, 2–3 mm × 2–3 mm. Leaves ± sessile, thick, narrowly elliptic, oblong, ovate or obovate, obtuse or blunt, 1.5–4.5 cm × 0.4–0.8 cm, channelled above, convex below. Flowers solitary, peduncle, pedicel and ovary totalling 5–9 mm long; flowers usually reversed, whitish with sepals usually yellow-tipped and labellum reddish brown, mentum a shallow cup well forward of ovary; dorsal sepal narrowly ovate to ovate, blunt, 4–5 mm × 1.3–2 mm, lateral sepals connate for $ca \frac{1}{3}$ their length, ovate, slightly dilated towards base, 4–5 mm × 1.5–2 mm; petals ± oblong-obovate, apiculate, ca 2 mm × ca 1.5 mm; labellum thick, decurved or convolute just past middle, ± ovate, ca 2 mm × ca 1 mm, slightly channelled above; column ca 1 mm long, foot curved forward, ca 1 mm long. Capsules ellipsoid to broadly ellipsoid, ca 8–10 mm long.

Recorded from southern Moreton district in mountainous areas, e.g. Beechmont, Springbrook, Lamington Plateau, either in rainforest or moderately exposed situations. Flowers usually spring–summer.

8. *Bulbophyllum argyropus* H. G. Reichb.

Thelychiton argyropus Endl.; *Bulbophyllum tuberculatum* auct. Aust. non Colenso

Small epiphyte; pseudobulbs usually ovoid or obovoid, contracting to slender apex, but sometimes irregularly shaped due to crowding, 4–7 mm × 2–4 mm, when young covered with white, scarios bracts. Leaves very shortly petiolate; blades oblong or narrowly oblong, acute, base cuneate to rounded, ca 2.2–2.5 cm × 0.3–0.6 cm. Inflorescences 3–3.5 cm long, peduncle, rachis and ovary tuberculate, pedicel including ovary ca 2.5–3 mm long, subtending bract acute, 1.5–2 mm long; flowers 2–4, translucent-white with labellum lobes greenish yellow and midlobe and disc orange, mentum almost truncate, very shallow, ca 1.5 mm × ca 1.5 mm; dorsal sepal triangular, acute, ca 3.5–4 mm × ca 1.25–1.5 mm; petals oblong-ovate, blunt, 2–2.5 mm × ca 0.75 mm; labellum 2.5–3 mm long, 3-lobed, lateral lobes erect, rounded, 2 erect longitudinal calli on disc inside lateral lobes, midlobe thick, linguiform, convex, blunt, hollow underneath; column ca 1 mm long with broad wings ca 0.5 mm long, foot ca 1.5 mm long. **Fig. 61C.**

Recorded from high altitudes in southern border areas, e.g. Lamington Plateau, growing in tops of rainforest trees. Flowers mainly autumn.

9. *Bulbophyllum weinthalii* R. Rogers

Small epiphyte growing into very densely packed masses; pseudobulbs usually ovoid or obovoid, contracting to slender apex, but often irregularly shaped due to crowding, 0.8–2 cm × 0.5–1.5 cm. Leaves narrowly ovate or narrowly oblong to oblong, acute, 1.5–3 cm × 0.4–0.9 cm. Flowers solitary, peduncle and pedicel usually shorter than pseudobulb, often too weak to support flower, ovary including pedicel ca 1–1.4 cm long; flowers white, cream or pale green, heavily and irregularly marked, spotted or suffused with reddish tones, labellum purple or mauve, opening widely, mentum almost truncate, very shallow, 8–10 mm × 5–6 mm; dorsal sepal ovate or oblong, ± mucronate, 0.8–1.2 cm × 0.4–0.6 cm, lateral sepals subdeltoid or falcate-deltoid, usually obtuse, 0.9–1.2 cm × 0.7–1.1 cm; petals ± oblong or oblong-obovate, 6–9 mm × 3–4 mm; labellum ca 6–9 mm × 5–8 mm, ± ovate to linguiform, apex rounded, lateral lobes obscure, traversed by 2 wide parallel longitudinal ridges converging near apex; column 4–5 mm long, dilating basally, winged, foot 8–10 mm long. **Fig. 61B.**

Recorded from high altitudes in southern border areas, e.g. Lamington Plateau, apparently growing only on *Araucaria cunninghamii*. Flowers mainly autumn.

45. OBERONIA Lindl.

Sympodial epiphytes or rarely lithophytes with very slender long or short stems. Leaves distichous, sheathing, bases overlapping, laterally flattened. Inflorescences terminal; flowers numerous, very small, often arranged in whorls, usually reversed; sepals ± equal, usually rather broad; petals usually slender, sometimes toothed; labellum spreading, 3-lobed, often indistinctly, often 2 auricles at base, apex entire, bifid and/or ± lacerated; column very short; pollinia 4 in 2 pairs, without caudicles.

330 species palaeotropical; 4 species Australia; 2 species south-eastern Queensland.

1. Flowers cream; bracts ovate, often margin laciniate; capsules 3–4 mm long
 Flowers red or pink; bracts filiform or subulate, margin entire; capsules 1.5–2 mm long

1. *O. muelleriana*
 2. *O. titania*

1. *Oberonia muelleriana* Schlechter

Oberonia iridifolia F. Muell.; *O. fitzgeraldiana* Schlechter

Epiphyte or lithophyte, \pm erect, growing into small clumps. Leaves 3–8, yellowish green, oblong, sometimes falcate, tapered to \pm acute apex, 3–15 cm \times 0.7–1.7 cm. Inflorescences 8–15(–20) cm long, sometimes with falcate bract 0.4–1.5 cm long near base of peduncle, pedicel including ovary 1.5–2.5 mm long, subtending bracts 1–1.5 mm long; flowers numerous, cream; dorsal sepal broadly ovate, obtuse, *ca* 1 mm long, lateral sepals sharply deflexed, broadly ovate, *ca* 0.5–1 mm long; petals \pm falcate, ovate, *ca* 1 mm long; labellum not distinctly lobed, ovate, apex shortly bifid, margin erose to \pm fimbriate and slightly decurved, *ca* 1.5 mm long; column *ca* 0.5 mm long. Capsules ellipsoid to obovoid, 3–4 mm long, ribbed. **Fig. 61E.**

Coastal districts in a wide variety of habitats, usually on trees with moderate light intensity, also on rocks. Flowers mainly spring.

2. *Oberonia titania* Lindl.

Oberonia palmicola F. Muell.; *Malaxis palmicola* (F. Muell.) F. Muell.

Small \pm erect epiphyte growing into large clumps. Leaves 4–10, green often suffused with dull pink, thin but fleshy, apex acute to acuminate, base somewhat dilated, 1–6 cm \times 0.3–0.8 cm. Inflorescences 1 or 2, 5–15 cm long, peduncle with numerous whorls of hair-like bracts *ca* 2–3 mm long and often falcate bracts 0.5–3 cm long towards base, pedicel including ovary 1–1.5 mm long, subtending bracts filiform, 1–1.5 mm long; flowers numerous, translucent-red or -pink; dorsal sepal ovate, obtuse, margin often recurved, *ca* 0.75 mm long, lateral sepals broadly ovate, *ca* 0.5 mm long; petals oblong-ovate or narrowly so, margin often recurved, *ca* 0.75 mm long; labellum *ca* 0.7 mm long, distinctly 3-lobed, lateral lobes *ca* 0.1 mm long, midlobe *ca* 0.4 mm long, margin entire, sometimes undulate; column *ca* 0.4 mm long. Capsules ellipsoid, 1.5–2 mm long, ribbed.

Coastal districts, mainly in rainforest or wet eucalypt forests. Flowers mainly summer–autumn.

46. PERISTERANTHUS Hunt

Semipendulous monopodial epiphytes; stems rigid. Leaves \pm oblong. Inflorescences racemose; flowers numerous, small; sepals and petals \pm equal, free, slender, lateral sepals at least partly joined to column foot to form obscure mentum; labellum hinged to apex of column foot, 2-lobed, spurred, lateral lobes large, erect, tapering to apex, midlobe absent, spur short and broad with an erect \pm finger-like callus arising from base of thickened anterior wall; column incurved, foot considerably shorter than column; anther with a rather long and slender rostrum, pollinia 4 in 2 closely appressed pairs, members of a pair unequal, attached by short filiform but highly elastic caudicles to slender stipe which is slightly longer than pollinia; viscidium \pm circular; rostellum bifid; stigma large.

1 species endemic in Australia, occurring in south-eastern Queensland.

1. *Peristeranthus hillii* (F. Muell.) Hunt

Saccolabium hillii F. Muell.; *Ornithochilus hillii* (F. Muell.) Benth.

Stems up to 25 cm long, curved up at apex. Leaves 3–10, coriaceous, \pm drooping, \pm oblong to oblong-elliptic, apex acute, unequally emarginate, 5–25 cm \times 1.5–4 cm. Racemes 1–6, pendulous, 5–25 cm long, peduncle very short, pedicel including ovary 1–1.5 mm long, subtending bract 1.5–2 mm long; flowers numerous, all facing apex of rachis, pale green copiously spotted with crimson, fragrant; sepals and petals all \pm similar, thick textured, widely spreading from base, narrowly oblong to narrowly obovate, obtuse, 2.5–3.5 mm \times 0.5–1 mm; labellum 2–2.5 mm long, lateral lobes 1–1.5 mm long, united with thickened vertical disc at anterior end, spur projecting slightly forward, *ca* 1 mm long, with rounded apex and very thick walls, erect conical callus arising from base of anterior wall, extending $\frac{3}{4}$ to *ca* as high as apex of disc, disc extending almost

vertically from anterior base of spur, very thick; column 1–1.5 mm long, erect near base but deflexed at right angles from *ca* middle, foot *ca* 0.5–0.8 mm long. Capsules \pm cylindrical, *ca* 2.5 cm long. **Fig. 61F.**

Coastal districts, mainly on lowlands and low ranges on rainforest trees. Flowers mainly spring.

47. **SACCOLABIOPSIS** J. J. Smith

Small monopodial epiphytes with short stems and rather narrow thin leaves. Inflorescences racemose, many-flowered; flowers small, facing apex of rachis, white or green; sepals and petals free, \pm similar but petals slightly shorter than sepals; labellum immoveably joined to base of column, saccate, 3-lobed, spurred at rear, lateral lobes very short and broad, obscure, midlobe saccate, thick-walled, spur \pm in line with column, slender, almost cylindrical, without calli, often with transverse ridge at orifice; column short, without foot; anther with long narrowly triangular rostrum, pollinia 4 in 2 unequal sized pairs, attached to long slender apically dilated stipe; rostellum projected forward, long, apex bifid; stigma large.

7–8 species, Java, New Guinea, eastern Australia; 2 species Australia; possibly 1 species occurring in south-eastern Queensland.

1. *Saccolabiopsis armitii* (F. Muell.) Dockr.

Sarcochilus armitii F. Muell.; *Cleisostoma armitii* (F. Muell.) F. M. Bailey; *C. orbiculare* Rupp; *Saccolabium orbiculare* (Rupp) Rupp; *Saccolabium armitii* (F. Muell.) Rupp

Stems 0.5–5 cm long. Leaves 3–6, usually yellowish green, oblong-elliptic to narrowly obovate, usually somewhat decurved about middle, slightly channelled, acute or obtuse, base cuneate to tapered, 1.5–6 cm \times 0.5–1.3 cm. Racemes 1–3, 3–9 cm long, pedicel including ovary 1.5–2.5 mm long, subtending bract acuminate, 1–1.5 mm long; flowers several, translucent-green with midlobe of labellum white, anther dark red; dorsal sepal elliptic to obovate, 2–2.5 mm long, lateral sepals narrowly obovate, *ca* 2.5 mm long; petals broadly elliptic to \pm orbicular, *ca* 1–1.5 mm long; labellum *ca* 2 mm long, lateral lobes obliquely broadly triangular, apex \pm rounded, midlobe \pm hemispherical, *ca* 0.5–0.8 mm long, spur *ca* 1.2–1.5 mm \times *ca* 0.5 mm, disc with high thick ridge extending across between front of lateral lobes, notched in centre; column *ca* 1.5 mm long. Capsules narrowly cylindrical to narrowly ellipsoid, *ca* 1.2–1.5 cm long. **Fig. 61G.**

Possibly occurring in northern parts of Wide Bay and Burnett districts, typically an epiphyte of depauperate rainforest areas near the coast on moderately high ranges, or up to 160 km inland. Flowers spring–summer.

48. **PAPILLILABIUM** Dockr.

Very small monopodial epiphytes with short stems. Leaves \pm linear. Inflorescences racemose; flowers strongly fragrant; sepals and petals free, \pm similar in length; labellum immoveably joined to apex of long column foot, lower part of lateral lobes united with lateral margins of back half of column foot to form spur, calli absent, lateral lobes short, very broad and crescent-shaped, midlobe short, bifid or emarginate, disc very thick, papillose; column erect, not winged, foot longer than column; anther with rostrum deflexed through *ca* 90°, pollinia 4 in 2 closely appressed pairs, stipe slender, slightly dilated apically; viscidium very small, attached to ventral surface of rostellum; rostellum slender, decurved.

1 species endemic in Australia, occurring in south-eastern Queensland.

1. *Papillilabium beckleri* (F. Muell. ex Benth.) Dockr.

Cleisostoma beckleri F. Muell. ex Benth.; *Sarcochilus beckleri* (F. Muell. ex Benth.) F. Muell.; *Sarcanthus beckleri* (F. Muell. ex Benth.) Rupp; *Saccolabium virgatum* Hunt

Stems up to 4 cm long, usually much shorter. Leaves 2–6, linear-elliptic or linear-oblong, 2–5 cm \times 0.2–0.4 cm. Inflorescences 1–4, 1–4 cm long, pedicel including ovary *ca* 2 mm

long, subtending bract *ca* 1 mm long; flowers 3–8, dull or pale green usually with purplish brown or rarely crimson markings, labellum white, green or greenish yellow and column greenish white sometimes with red; sepals narrowly oblong, acute or obtuse, *ca* 3 mm long, lateral ones adnate to column foot; petals linear-oblong, *ca* 3 mm long; labellum *ca* 4–4.5 mm long, spur in line with disc, obtuse, *ca* 2–2.5 mm long, disc decurved distally, very thick, papillose, papillae extending into spur, lateral lobes *ca* 1 mm long but very broad, transversely falcate, midlobe decurved, *ca* 0.3–0.5 mm long, apex bifid, segments \pm ovate; column *ca* 1.5 mm long, foot \pm in line with column, *ca* 2–2.5 mm long.

Fig. 61H.

Reported from the region in areas at low to moderate altitudes on the outer twigs of rainforest trees, often near watercourses, e.g. Mt Glorious, Lamington Plateau at Canungra Ck. Flowers spring.

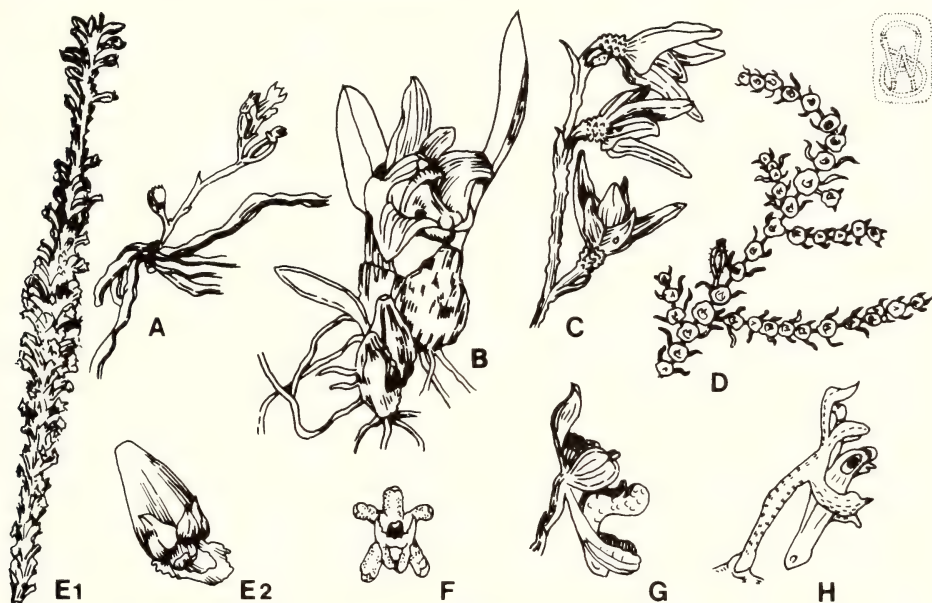


Fig. 61 ORCHIDACEAE — **A** *Taeniophyllum muelleri*, habit $\times 1\frac{1}{2}$; **B–D** *Bulbophyllum* spp. — **B** *B. weinthalii*, habit $\times 1$; **C** *B. argyropus*, part inflorescence $\times 3$; **D** *B. minutissimum*, habit $\times 1$; **E₁–E₂** *Oberonia muelleriana*, **E₁** part inflorescence $\times 1$, **E₂** flower $\times 6$; **F** *Peristeranthus hillii*, flower $\times 3$; **G** *Saccolabiopsis armitii*, flower $\times 6$; **H** *Papillilabium beckleri*, flower $\times 3$.

GYMNOSPERMAE

KEY TO THE FAMILIES

1. Leaves pinnate, arranged palm-like in a crown at the apex of a trunk, or arising from a subterranean caudex 2
 Leaves simple, opposite or alternate on the branchlets of trees or shrubs 3
2. Pinnae with 1 prominent midrib, lacking lateral veins 197. Cycadaceae
 Pinnae without a midrib but with few-several equally visible longitudinal veins 198. Zamiaceae
3. Ovules solitary, borne on scales at end of axillary peduncle, scales few, often uniting with axis to form a fleshy structure supporting seed, never becoming woody 199. Podocarpaceae
 Ovules 1-many per scale, borne in definite cones which become woody, scales 6-many 4
4. Leaves usually decurrent on the branchlets, opposite or whorled; cone-scales opposite or whorled, usually valvate 200. Cupressaceae
 Leaves usually free from branchlets except basally, spirally arranged or in "tufts"; cone-scales spirally arranged, imbricate 5
5. Male sporophylls with 2 sporangia; ovules 2 per scale; (naturalized species with 2-5 long linear leaves enclosed in a basal sheath: *Pinus*) 201. Pinaceae
 Male sporophylls with several-many sporangia; ovule 1 per scale; (native species with leaves flat or acicular but each separate from the rest) 202. Araucariaceae

197. CYCADACEAE

Dioecious, palm-like, usually unbranched woody plants, trunk thick, cylindrical, clothed with old frond bases. Fronds spirally arranged to form conspicuous crown, simply pinnate, pinnae with single thick midrib, lacking lateral veins, circinnately involute in bud. Male cones compact, microsporophylls pedicellate, terminating in an upcurved upper part, completely covered on lower surface by microsporangia; female sporophylls not forming determinate cone but sessile and spirally arranged in terminal mass and falling separately at maturity, central axis of plant continuing vegetative growth, expanded end of sporophyll pinnatifid, pectinate or toothed, ovules 2-several, inserted marginally in subopposite notches proximal to blade, obliquely directed outward. Seeds large, outer surface fleshy, embryo with two cotyledons.

1 genus with *ca* 20 species Madagascar, eastern and south-eastern Asia, Indomalaysia, Australia, Polynesia; 1 genus with *ca* 9 species Australia; 1 genus with 1 species south-eastern Queensland.

1. CYCAS L.

Palm-like trees or shrubs. Fronds developing groupwise, frond bundles alternating with groups of scales; petioles spiny; pinnae coriaceous. Male cones shortly pedicellate, sporophylls cuneate, usually produced into straight or incurved point; females sessile, sporophylls numerous, loosely imbricate, spatulate, densely pubescent, bearing 2-4 ovules on each margin below apex, widened apex serrate or pinnatifid with a long cusp, above female parts normal fronds developing again afterwards. Seeds large, ovoid or ellipsoid, compressed.

About 20 species, Madagascar, eastern and south-eastern Asia, Indomalaysia, Australia, Polynesia; *ca* 9 species Australia; 1 species south-eastern Queensland.

1. *Cycas media* R. Br.

CYCAS; TREE ZAMIA; ZAMIA PALM

Tree up to 7.5 m tall, sometimes branching in upper half, but usually 1.5–2 m tall. Fronds numerous, 0.6–1.7 m long on mature plants; petioles excluding pubescent expanded base 18–30(–35) cm long, usually with 2 rows of spines; rachis rounded or flattened above, rounded or angular below when dry, 0.6–1.3 cm broad at lowest pinnae, often ferruginous pubescent when young; pinnae numerous, often 150–250 per frond, in 2 rows, spreading, linear, usually straight or sometimes slightly falcate, apex abruptly acute or somewhat obtuse, usually pungent, base \pm decurrent on rachis, margin \pm flat, longest 11–27 cm \times 0.4–0.8 cm, shiny dark green above, midrib prominent, lowest pinnae passing into spines or prickles on petiole. Male cones ovoid, *ca* 12–15 cm \times *ca* 7–12 cm, sporophylls \pm cuneate, 2–3 cm \times 1.2–1.5 cm, point *ca* 1 cm long; female sporophylls 15–30 cm long, usually densely ferruginous pubescent, with a long narrow stipes and short expanded narrowly to broadly ovate portion, margin of expanded part serrated to deeply toothed, 2–5 cm \times 1.5–3.5 cm, upturned point 2–3 cm long, ovules 3–6 per margin usually below expanded part. Seeds dull green to yellowish when ripe, ovoid, *ca* 3.5–4 cm \times *ca* 3.5 cm \times *ca* 3 cm. **Fig. 62C.**

Wide Bay and Burnett districts usually on hillsides on stony soils, in open forests. The seeds and young leaves have been proved poisonous to stock.

198. ZAMIACEAE

Dioecious plants; stems subterranean or forming a trunk, unbranched or few-branched. Fronds spirally arranged in a crown, pinnate or rarely bipinnate, straight or folded, interspersed with rudimentary leaves, leaf bases persistent on trunk or deciduous; pinnae without a midrib but with few–many longitudinal veins. Cones axillary or terminal with spirally arranged or apparently vertically rowed sporophylls; male sporophylls bearing globose sporangia \pm clustered in groups in 2 collateral, sometimes confluent areas on undersurface, sporangia dehiscent by slits; female sporophylls simple, each consisting of a barren stipe and an expanded thickened end, bearing 2 or rarely 3 sessile ovules on the axis-facing margin. Seeds large, subglobular to subcylindrical or variously angled, with a fleshy outer layer and a woody inner layer, endosperm present, cotyledons 2, germination hypogeal.

8 genera with *ca* 80 species, tropical to warm temperate parts of America, Australia, Africa; 3 genera with 18 species Australia; 2 genera with 4 species south-eastern Queensland.

1. Frond bases shortly tomentose; pinnae inserted on adaxial midline of rachis; cones \pm sessile; sporophyll ends tomentose

1. *Lepidozamia*

- Frond bases densely silky to woolly tomentose with long hairs; pinnae inserted near edges of rachis; cones pedunculate; sporophyll ends glabrous, glaucous

2. *Macrozamia***1. LEPIDOZAMIA Regel**

Palm-like plants with a usually unbranched trunk clothed with persistent leaf bases. Fronds simply pinnate, not twisted, rudimentary leaves abundant; petiole bases swollen, shortly tomentose; pinnae numerous, spreading, inserted alternately along adaxial midline of rachis, falcate. Cones of both sexes \pm sessile, large, axillary amongst cataphylls of crown, sporophylls spirally arranged, tomentose at ends, not spiniferous; male sporophylls with a linear spatulate fertile region and a \pm triangular-rhomboid laterally expanded end, deflexed in a spiral series at sporangial dehiscence; female sporophylls with elongated terete to subangular stipes and a dorsiventrally biconvex, laterally expanded, somewhat deflexed, shortly tomentose end, bearing 2 or sometimes 3 ovules on inward facing margin, tapered into flattened, \pm acute, at first deflexed but on drying upturned, ultimate tip. Outer seed coats red or yellowish, fleshy, inner hard.

2 species endemic in eastern Australia; 1 species south-eastern Queensland.

1. *Lepidozamia peroffskyana* Regel

Macrozamia denisonii C. Moore & F. Muell.; *M. peroffskyana* (Regel) Miq.

Stems up to *ca* 6 m tall. Fronds *ca* 2–3 m long on mature plants, ± puberulous especially the rachis, glabrescent with age; petioles, excluding short very swollen tomentose base, up to 30–60 cm long; rachis ± rounded, ± laterally compressed, angled to middle pinna-bearing keel on upper surface; pinnae 200 or more, spreading but recurved-drooping towards ends, broadly linear, falcate, apex acute, mucronate, base slightly contracted, mostly 10–35 cm × 0.7–1.5 cm, shining green above, with 7–14 scarcely raised veins below. Cones sessile, usually solitary, axillary, base surrounded by several rows of thick velvety-tomentose subulate-tipped cataphylls 10–15 cm long; male cones ± contorted, subcylindrical, *ca* 40–60 cm × 10–26 cm, sporophylls 6–8 cm long, fertile region 4–6 cm long, broadened end ± reflexed but acute tips often upturned; female cones ovoid, *ca* 50–80 cm × 25–30 cm, sporophylls 5–8 cm × 3.5–6.5 cm, ends deflexed but tips sometimes turned upwards, ovules usually 2, occasionally 3. Seeds red, 4–6 cm × 3–3.5 cm. **Fig. 62A.**

Mountainous areas of Moreton and Wide Bay districts, in wet eucalypt forest sometimes bordering on rainforest, e.g. McPherson Ra., Tamborine Mtn, D'Aguilar Ra., Blackall Ra. Sometimes cultivated as an ornamental.

2. **MACROZAMIA** Miq.

Usually palm-like plants with usually unbranched stems forming a subterranean caudex or a rather massive aerial trunk clothed with persistent leaf bases, all parts ± pubescent when young, glabrous except for leaf bases at maturity. Fronds few-numerous, simply pinnate, pinnae sometimes dichotomously divided; petiole bases expanded, mostly silky or woolly tomentose; rachis straight or twisted; pinnae numerous in mature plants, spreading or secund, inserted near edges of rachis at adaxial side, simple or 1–3-forked, straight or falcate, contracted or sometimes with a thickened basal callus. Cones of both sexes pedunculate, axillary amongst leaves with several cataphylls below and sometimes on the peduncle, sporophylls spirally arranged, glabrous often glaucous, spiny on ends; male sporophylls with broadly cuneate fertile region bearing sporangia beneath in 2 separate or confluent areas and an upturned end terminated by an erect or spreading-erect spine, sometimes very short; female sporophylls appearing peltate with an angular-rounded stipe, and a laterally expanded, ± terminally compressed end with a narrow transverse wing terminated by a ± erect spine, 2 ovules borne on inward-facing margin of sporophyll end. Sporophylls falling with seeds attached by the outer fleshy red or yellow seed coat, inner coat hard.

14 species endemic in Australia; 3 species south-eastern Queensland.

Species of **Macrozamia** are sometimes called **BURRAWANG PALM**.

1. Large plants with 15–150 fronds in crown, aerial trunk sometimes present; pinnae with nerves visible but not or scarcely raised on lower surface when dry, bases with a conspicuous callus on anterior margin, ± rugose when dry

Small plants with 2–12 fronds in crown, (*M. lucida* sometimes more), caudex almost or wholly subterranean; pinnae with nerves thick, raised and prominent on undersurface, especially when dry, bases without or with only a slight callus on anterior margin, not rugose when dry

1. *M. miquellii*

2. Pinnae glossy, falcate, whitish basally when living, usually 0.7–1.2 cm broad; rachis not or scarcely twisted

Pinnae dull to shining above, straight or slightly falcate, base pale or reddish when living, usually 0.2–0.5 cm broad; rachis always twisted through at least 2 complete revolutions

2. *M. lucida*

3. *M. pauli-guilielmi*

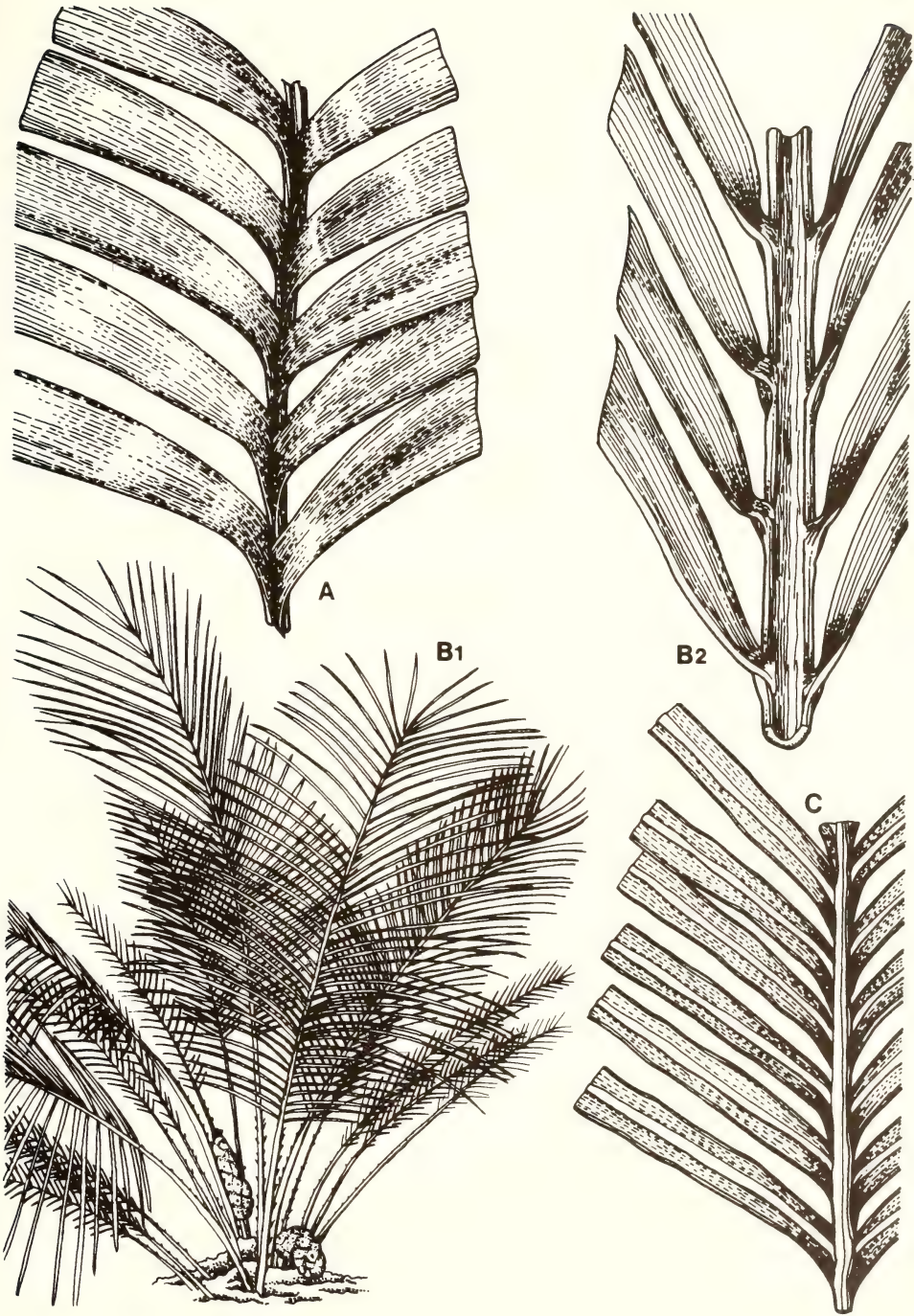


Fig. 62 A-B ZAMIACEAE — A *Lepidozamia peroffskyana*, part leaf showing insertion of pinnae $\times 1$; B₁–B₂ *Macrozamia miquelii*, B₁ habit $\times \frac{1}{10}$, B₂ part leaf showing insertion of pinnae and numerous longitudinal veins $\times 1$; C CYCADACEAE — *Cycas media*, part leaf showing insertion of pinnae and prominent midvein $\times 1$.

1. *Macrozamia miquellii* (F. Muell.) A. DC.ZAMIA; ZAMIA PALM;
WILD PINEAPPLE

Encephalartos miquellii F. Muell.; *E. spiralis* (Salisb.) Lehm. var. *major* Miq.; *Macrozamia macleayi* Miq.; *M. tridentata* (Willd.) Regel var. *oblongifolia* Regel; *M. mackenzii* Hort. ex Mast.; *M. douglasii* W. Hill ex F. M. Bailey; *M. cylindrica* C. Moore; *M. mountperriensis* F. M. Bailey; *M. spiralis* var. *cylindrica* (C. Moore) Maiden & Betche

Caudex mostly subterranean, rarely forming trunk up to 1 m tall. Fronds \pm 50–100 in crown, at first erect, later spreading, 0.6–2 m or more long on mature plants; petioles, excluding woolly swollen base, 12–50 cm long; rachis not twisted, somewhat strongly flattened, 0.7–1.8 cm broad at lowest pinnae, subangular-convex beneath; pinnae 70–160, widely spreading but forwardly directed at an acute angle, linear, \pm straight, tapered to acute pungent apex, base markedly contracted and with anterior callus, \pm rugose at base when dried, entire to sometimes sinuate, largest 17–35 cm \times 0.4–1.1 cm, shining above, with 6–13 scarcely raised veins beneath, sometimes 2 or 3 but often up to 15 of the lowest pinnae reduced and spine-like. Cones 1–several per plant, cataphylls *ca* 15 cm or more long; male cones cylindrical, often curved when old, 15–35 cm \times (3–)4–6.5 cm, sporophylls cuneate to cuneate-obovate, 1.5–2.8 cm \times 1–1.8 cm, upturned spine 0.1–2.5 cm \times 0.2–0.5 cm, longest near cone apex; female cones cylindrical, (15–)20–40 cm \times 7–13 cm, on peduncles 20–45 cm long, sporophylls 3–4.5 cm long on stipes 2–3 cm long, expanded ends slightly glaucous, 1.5–3.2 cm \times 2.5–6 cm, spines flattened and erect, from obsolete up to 2–3.5 cm \times 0.5–1 cm, longest near cone apex. Seeds orange to red when ripe, (2–)2.5–3.5 cm \times 1.8–3 cm. **Fig 62B.**

Coastal districts and eastern Burnett district, mainly in open forest.

M. douglasii and *M. mountperriensis* have been treated as synonyms of *M. miquellii* by L. A. S. Johnson in The Families of Cycads and the Zamiaceae of Australia, *Proc. Linn. Soc. N.S.W.*: 84 (1959) p 64, on the basis that they are luxuriant (Fraser I. in sand) and depauperate (stony hills) forms respectively. These two differ from *M. miquellii* by not having basal pinnae reduced to spines, or only 1 or 2, but in other respects they appear to be within the range of variation. See also note under *M. lucida*.

2. *Macrozamia lucida* L. A. S. Johnson

PINEAPPLE ZAMIA

Macrozamia spiralis auct. non (Salisb.) Miq., F. M. Bailey

Caudex mostly subterranean, 10–20 cm diameter. Fronds usually 2–15 in crown, sometimes more, at first erect, later spreading, 0.8–1.1 m or more long on mature plants; petiole excluding woolly expanded base 25–50 cm long; rachis not or scarcely twisted, usually rounded rather than flattened, 3–7 mm broad at lowest pinnae, with 2 narrow lateral grooves decurrent from pinnae bases, rounded-convex beneath; pinnae 50–100, spreading but the 2 ranks not in the same plane, twisted basally and forward-facing, most recurved-falcate, linear, tapered to pungent apex, contracted to conspicuously whitish, slightly callose but not rugose base, entire, longest 15–35 cm \times 0.7–1.1 cm, shining green above, 5–11 prominent raised nerves beneath. Well developed cones not seen; according to literature male cones cylindrical, 15 cm or more \times *ca* 4 cm diameter, sporophylls up to *ca* 4 cm long, spines from almost obsolete on lower sporophylls to *ca* 1.2 cm long on upper; female cones 15–20 cm \times 7.5–9 cm, expanded sporophyll ends up to 2 cm \times 4 cm, spines 0.6–5 cm long, longest near apex. Seeds reddish, *ca* 2.5 cm long.

Coastal districts on hillsides in mainly open forest, e.g. Woombye, Jimna areas.

When young this species can be difficult to distinguish from *M. miquellii*, but *M. miquellii* soon develops reduced lower pinnae and more pronounced callosities on the pinnae bases. The associated characters of relatively shorter petioles and less prominent nerves appear later.

3. *Macrozamia pauli-guilielmi* W. Hill & F. Muell.ZAMIA; ZAMIA PALM;
WILD PINEAPPLE; PINEAPPLE ZAMIA

Caudex mostly subterranean, sometimes up to 10–15 cm above ground, *ca* 10–20 cm diameter. Fronds *ca* 2–12 in crown, at first erect, later spreading, 0.6–1.1 m long on mature plants; petiole excluding woolly expanded base 5–10(–15) cm long; rachis spirally twisted through at least 2 complete revolutions, 0.5–1.1 cm broad at lowest pinnae, flattened above, with 2 narrow often very indistinct lateral grooves decurrent from bases of pinnae; pinnae 140–200, crowded, \pm spreading and forward-facing, linear, straight or slightly falcate but lax and drooping, markedly concave, apex abruptly tapered, weakly pungent, base tapered, pale or reddish, slightly callose but not rugose, entire or apically 2- or 3-toothed, longest 15–30 cm \times 0.2–0.5 cm, dull to shiny dark green above, 3–5, rarely 7 prominent nerves below. Cones 1–4 per plant, cataphylls spine-like; male cones cylindrical or ellipsoid-cylindrical, sometimes somewhat curved when old, 8–25 cm \times 4–6 cm, sporophylls cuneate to cuneate-obovate, 1.5–2.3 cm \times 1.3–2 cm, spines from \pm obsolete to 7 mm long near apex; female cones ovoid to cylindrical, 10–25 cm \times 7–8.5 cm, peduncle 12–20 cm long, sporophylls 3–4 cm long on stipes 2.5–3 cm long, expanded ends 1.5–3 cm \times 3.5–6 cm, flattened spines 0.3–4 cm long, longest near cone apex. Seeds orange to scarlet when ripe, 2.5–3 cm \times 2–2.5 cm.

Wide Bay district, on sandy soils in open forest, e.g. near Teewah Ck., Tin Can Bay, also Inglewood area of the Darling Downs district, on sandy soils.

199. PODOCARPACEAE

Monoecious or dioecious evergreen trees or shrubs. Leaves spirally arranged, rarely opposite, scale-like or acicular, or linear to narrowly ovate or oblong. Male stroboli in terminal or axillary clusters, sporophylls spirally arranged, each bearing 2 microsporangia; female inflorescence with 1–numerous fertile scales, often only 2–4, each bearing one inverted ovule, scales sometimes fusing with axis, and the whole expanding to form a succulent, globular or ovoid structure on which the single ovule is seated. Cotyledons 2.

6 genera with 125 species, mostly southern hemisphere extending north to Japan, central America and West Indies; 5 genera with 12 species Australia; 1 genus with 2 species south-eastern Queensland.

1. *PODOCARPUS* L'Hérit.

Dioecious shrubs or trees. Leaves various, scale-like to large and flattened. Male stroboli cylindrical, terminal or in spikes on lateral branches; female inflorescence mostly reduced to a short thickened stalk with a few sterile bracts and 1 or 2 ovules enveloped by the ovuliferous scale. Fruits usually consisting of a fleshy or woody mass (receptacle) bearing 1 or 2 seeds with a coriaceous or fleshy outer coat.

100 species, tropical to temperate southern hemisphere north to Himalayas and Japan; 7 species Australia; 2 species south-eastern Queensland.

1. Leaf blades narrowly oblong to narrowly oblong-elliptic, 0.5–2 cm

wide

1. *P. elatus*

- Leaf blades linear to linear-elliptic, 0.3–0.4 cm wide 2. *P. spinulosus*

1. *Podocarpus elatus* R. Br. ex Endl.

SHE PINE; BROWN PINE; YELLOW PINE

Tree up to 40 m tall; trunk not prominently buttressed but sometimes irregularly or spirally fluted or channelled; bark brown, usually fibrous and finely fissured. Leaves somewhat distichous; petioles 1–3 mm long; blades narrowly oblong to narrowly oblong-elliptic, apex pungent pointed, base cuneate, 3–18 cm \times 0.5–1.2 cm, dark glossy green above, paler beneath, midrib prominent. Male stroboli in sessile axillary or supra-axillary clusters, narrowly cylindrical, 0.5–2 cm long; female stroboli axillary, usually only 1 ovule or occasionally 2 developing to maturity. Immature fruits green, covered with a waxy bloom; mature fruits with fleshy bluish black receptacle *ca* 2.5 cm \times *ca* 2.5 cm, with

slightly fleshy resinous globular seed 0.8–1.2 cm diameter on summit; seed enclosed in woody nut. **Fig. 63A.**

Recorded from the coastal districts and Great Dividing Ra. in rainforests. Wood has been used for turnery, furniture, joinery, boat planking, and piles in salt water; the timber takes a fine polish. Receptacle edible with a resinous plum-like taste.

2. *Podocarpus spinulosus* (Smith) R. Br. ex Mirbel

Taxus spinulosa Smith; *Podocarpus pungens* Caley ex D. Don

Shrub or small tree with weak straggly branches. Leaves with petioles 1–2 mm long; blades linear to linear-elliptic, apex pungent pointed, base attenuate, (1.5–)3–6(–8) cm × (0.2–)0.3–0.4 cm, glossy green above, paler beneath, midrib prominent. Male stroboli in axillary clusters, slender-cylindrical, 4–8 mm long; female stroboli axillary, solitary. Mature fruits with fleshy glaucous blue-black receptacle, bearing 1, occasionally 2 almost globular seeds 0.8–1.2 cm diameter on summit.

Recorded from Stradbroke I. in the Moreton district.

200. CUPRESSACEAE

Monoecious or dioecious, much-branched, erect or prostrate, trees or shrubs. Leaves decussate or in whorls of 3 or 4, young leaves acicular, mature leaves usually small, scale-like, decurrent, often dimorphic. Stroboli solitary or clustered, axillary or terminal, sporophylls opposite or in whorls of 3; male stroboli with several–many sporophylls, each bearing 3–6 microsporangia on undersurface; female shoots usually with 1–several pairs of whorls of fertile or sterile scales, ovules 1–8 at base of scale, rarely with 1–3 terminal ovules. Mature cones with usually woody, rarely ± fleshy scales, scales imbricate or valvate, usually finally separating; seeds free, rarely united in a drupe, winged or unwinged, cotyledons usually 2, rarely 5 or 6.

19 genera with 130 species cosmopolitan; 3 genera with 19 species Australia; 1 genus with 7 species south-eastern Queensland.

1. *CALLITRIS* Vent.

Monoecious trees or shrubs; branches spreading or erect. Juvenile leaves in whorls of 4, in some species remaining on mature trees, mature leaves in whorls of 3, scale-like, decurrent, tip free, apex triangular. Male stroboli ovoid to cylindrical, solitary or several together at ends of branchlets; sporophylls in whorls of 3, rarely 4, bearing 2–4 pollen sacs; female cones depressed globular, globular-ovoid or conical, cone scales in a single whorl, each with numerous ovules. Mature cones woody; seeds winged.

16 species Australia, New Caledonia; 14 species Australia; 7 species south-eastern Queensland.

Species of *Callitris* are commonly called CYPRESS PINE.

- | | |
|--|--|
| 1. Dorsal surface of leaves rounded | 2 |
| Dorsal surface of leaves keeled | 3 |
| 2. Cone scales smooth or wrinkled, but not verrucose on back | 1. <i>C. columellaris</i> |
| Cone scales ± densely verrucose on back | 2. <i>C. preissii</i>
subsp. <i>verrucosa</i> |
| 3. Cone scales ± densely verrucose on back | 2. <i>C. preissii</i>
subsp. <i>verrucosa</i> |
| Cone scales smooth or wrinkled but not verrucose on back | 4 |
| 4. Scales of mature female cones ± equal in length and width, all tapering towards apex | 3. <i>C. macleayana</i> |
| Scales of mature female cones alternating larger and smaller, not all tapering evenly towards apex | 5 |

- | | | |
|--|-------------------------|---|
| 5. Mature female cones 1–1.3 cm diameter; dorsal surface of leaves prominently and acutely keeled | 4. <i>C. baileyi</i> | 6 |
| Mature female cones (1.2–)1.5–2.5 cm diameter; dorsal surface of leaves prominently but not acutely keeled | | |
| 6. Mature female cones with columella 4–6 mm long | 5. <i>C. monticola</i> | 7 |
| Mature female cones with columella up to 3 mm long | | |
| 7. Mature female cones with a short broad conical protuberance on dorsal surface; seeds with 2 wings <i>ca</i> 1 mm wide | 6. <i>C. rhomboidea</i> | |
| Mature female cones with small dorsal point near apex; seeds with 2 wings up to 3 mm wide | 7. <i>C. endlicheri</i> | |

1. *Callitris columellaris* F. Muell.**WHITE CYPRESS PINE**

Green or glaucous tree up to 20(–30) m tall with spreading, ascending or fastigate branches. Leaves including decurrent part 1–3 mm long, dorsal surface rounded. Male stroboli cylindrical, 3–5 mm long. Female cones solitary on slender fruiting branchlets, ovoid to globose, 1.2–2 cm diameter, cone scales 6, thin, dorsal point below apex small or absent, alternate scales shorter and narrower, all separating almost to base of cone, often spreading widely after maturity, columella 4–7 mm long, often thick and angled; seeds numerous, with 2 wings up to 6 mm wide. **Fig. 63B.**

Two varieties occur in the region:

- | | |
|---|---|
| 1. Foliage usually green; coastal districts | <i>C. columellaris</i> var. <i>columellaris</i> |
| Foliage usually glaucous; inland districts | <i>C. columellaris</i> var. <i>campestris</i> |

C. columellaris var. *columellaris* has been recorded from along or near the sea coasts on sands. It has been cultivated as an ornamental. *C. columellaris* var. *campestris* Silba (*C. glauca* R. Br. ex R. T. Baker & H. G. Smith; *C. robusta* R. Br. ex F. M. Bailey in part; *C. glaucophylla* Thompson & L. A. S. Johnson; *C. hugelii* auct. non (Carriere) Franco) is found in the inland districts on very sandy soils. Its timber is very durable, resisting decay and attack by termites and marine borers, and is widely used for flooring and lining boards, poles and posts in both country and metropolitan areas.

2. *Callitris preissii* Miq. subsp. *verrucosa* (Cunn. ex Endl.) J. Garden**MALLEE
CYPRESS PINE**

Frenela verrucosa Cunn. ex Endl.; *Callitris verrucosa* (Cunn. ex Endl.) F. Muell.; *C. robusta* R. Br. ex F. M. Bailey in part; *C. preissii* var. *verrucosa* (Cunn. ex Endl.) Silba
Stunted or several-stemmed shrub or tree up to *ca* 4 m tall. Leaves including decurrent part 2–4 mm long, usually not keeled. Male stroboli ± cylindrical, up to 5 mm long. Female cones solitary or several together on stout often clustered fruiting branchlets, remaining on the branchlets long after maturity, ovoid to globose, 1.5–2.5 cm diameter, cone scales 6, thick, dorsal point very small or absent, alternate scales reduced, all densely tuberculate, columella 2–4 mm long, thick; seeds numerous, dark brown, usually with 2 wings *ca* 3 mm wide. **Fig. 63C.**

Recorded from south-western Darling Downs district, west of Millmerran, and Inglewood areas, on sand.

Some authors have thought that the Queensland population is more likely to be a hybrid between *C. preissii* subsp. *verrucosa* and *C. columellaris*.

3. *Callitris macleayana* (F. Muell.) F. Muell.

Octoclinus macleayana F. Muell.; *Callitris parlatoresi* F. Muell. ex Seem.

Medium to tall tree up to 20(–40) m tall, branches spreading, bark fibrous and stringy, sometimes scaly. Leaves including decurrent part 2–6 mm long, dorsal surface acutely keeled; juvenile leaves often produced over much of crown, particularly in young trees, linear, pungent pointed, 0.8–1.5 cm long. Male stroboli oblong, 4–8 mm long. Female cones solitary on thick often glaucous fruiting branchlets which broaden towards base of cone, persistent, ovoid or conical, acuminate, often distorted, 1.5–3 cm diameter, cone scales 6 (or 8 in cones on juvenile branches), thick, all of similar size and shape, tapering

towards apex, with small dorsal point towards apex, columella *ca* 1 mm long, 3-lobed or 3-partite (occasionally 4-lobed in cones on juvenile branches); seeds ovoid with 1 long wing. **Fig. 63D.**

Moreton and Wide Bay districts usually in transitional zones between tall open forest and rainforest, e.g. Tamborine Mtn, Lamington National Park, D'Aguilar Ra., Gympie area. Timber durable, less knotty than *C. columellaris*, and has been used for weatherboards and shingles as well as interior work such as joinery and cabinets. Cultivated as an ornamental.

4. *Callitris baileyi* C. T. White

Slender green tree up to *ca* 15 m tall; bark greyish. Leaves including decurrent part 2–5 mm long, dorsal surface acutely and prominently keeled. Male stroboli *ca* 2–3 mm long on ends of branchlets. Female cones solitary, sessile on ends of branchlets, ovoid to oblong, 1–1.3 cm diameter, cone scales 6, thick, each with prominent dorsal point below apex, furrowed below point, alternate scales slightly shorter and narrower, columella stout, narrowed at base, slightly angled, 3–4 mm long. **Fig. 63E.**

Hilly or mountainous areas of the Moreton, Darling Downs and Burnett districts, e.g. Marburg Ra., Yarraman area, Bunya Mts, Wondai areas.

5. *Callitris monticola* J. Garden

Erect bushy glaucous shrub or tree up to 5(–12) m tall, branchlets \pm horizontal, short. Leaves including decurrent part 2–4 mm long, dorsal surface prominently keeled. Male stroboli ovoid to cylindrical, 2–4 mm long. Female cones solitary or several together on stout often clustered fruiting branchlets, persistent, broadly ovoid to globose, 1.5–2.5 cm diameter, cone scales 6, thick, dorsal surface in immature cone closely wrinkled, each with dorsal protuberance close to apex, alternate scales reduced in size, larger scales angled towards apex, columella 4–6 mm long, broadly 3-lobed; seeds numerous, dark brown, with 2 wings 2–3 mm wide. **Fig. 63G.**

Border ranges and rocky mountains, e.g. Lamington Plateau, Mt Maroon and rocky areas near Wallangarra, on very shallow rocky soil, in open forest or stunted vegetation.

6. *Callitris rhomboidea* R. Br. ex Rich. & A. Rich.

DUNE CYPRESS PINE

Callitris cupressiformis Don; *C. tasmanica* R. T. Baker & H. G. Smith

Often glaucous shrub or tree up to *ca* 12 m tall with horizontally spreading, erect or fastigate branches. Leaves including decurrent part usually 2–3 mm long, prominently keeled. Male stroboli ovoid to obovoid, *ca* 2 mm long. Female cones usually several together on clustered fruiting branchlets, remaining on branchlets long after maturing, globose to depressed globose, 1.2–2 cm diameter, cone scales 6, thick, each with a short broad conical protuberance, alternate scales much reduced in size, columella 2–3 mm long, 3-lobed or 3-partite; seeds numerous, dark brown, usually with 2 wings *ca* 1 mm wide. **Fig. 63F.**

Recorded from all districts of the region but mainly in coastal areas, on sandy soils in open forest. Cultivated as an ornamental.

7. *Callitris endlicheri* (Parl.) F. M. Bailey

BLACK CYPRESS PINE

Frenela endlicheri Parl.; *Callitris calcarata* (Cunn. ex Mirbel) F. Muell. nom. illeg.

Green or glaucous tree up to 15 m tall, branches spreading. Leaves including decurrent part 2–4 mm long, dorsal surface prominently keeled. Male stroboli ovoid to obovoid, up to 3 mm long. Female cones solitary or several together on rather slender usually clustered fruiting branchlets, ovoid to globular or globose, 1.2–2 cm diameter, cone scales 6, thick, or each with a small dorsal point near apex, and often ridged or wrinkled below when dry, never furrowed, alternate scales shorter and narrower, columella usually very short, either 3-partite or with 3 or 4 separate parts; seeds numerous, usually dark brown, usually with 2 wings up to 3 mm wide. **Fig. 63H.**

Darling Downs, Burnett and Wide Bay districts on stony or rocky hills, e.g. Boondooma area, Hibbett's Mtn, Gundiiah area, Stanthorpe and Wallangarra areas, Gurulmundi.



Fig. 63 **A** **PODOCARPACEAE** — *Podocarpus elatus*, part of fruiting branchlet $\times \frac{2}{3}$; **B–H** **CUPRESSACEAE** — *Callitris* spp. — **B₁–B₃** *C. columellaris*, **B₁** part branchlet $\times 6$; **B₂** T.S. of branchlet showing rounded backs of leaves $\times 16$; **B₃** fruit showing prominent central column $\times 2$; **C** *C. preissii* subsp. *verrucosa*, fruit $\times 2$; **D** *C. macleayana*, fruit $\times 2$; **E₁–E₃** *C. baileyi*, **E₁** part branchlet $\times 6$, **E₂** T.S. of branchlet showing keeled backs of leaves $\times 16$, **E₃** fruit $\times 2$; **F₁–F₃** *C. rhomboidea*, **F₁** part branchlet $\times 6$, **F₂** T.S. of branchlet showing keeled backs of leaves $\times 16$, **F₃** fruit $\times 2$; **G** *C. monticola*, fruit $\times 2$; **H** *C. endlicheri*, fruit $\times 2$.

201. PINACEAE

Monoecious trees, rarely shrubs. Leaves spirally arranged but sometimes apparently in 2 or more rows, or in tufts, linear, free or needle-like. Male stroboli with numerous spirally arranged sporophylls, each with 2 microsporangia on lower surface, pollen with 2 bladders; female stroboli with numerous spirally arranged bract-scales, bearing on their upper surface the \pm free, flat ovuliferous scale, which bears on its upper surface 2 anatropous ovules with 1 integument. Mature cones woody, closed until ripe, mostly composed of the much-enlarged ovuliferous scales, the bract scales also enlarged but narrower and thinner than the ovuliferous scales or reduced and hidden; seeds 2 per fertile scale, mostly unilaterally winged, embryo with several cotyledons.

10 genera with 250 species chiefly northern hemisphere, but also south to Sumatra, Java, Central America to West Indies; numerous genera and species cultivated Australia, both for ornament and timber production; 1 genus with 1 possibly 2 or 3 species naturalized south-eastern Queensland.

1. PINUS L.

Evergreen resinous trees with \pm whorled branches. Shoots and leaves of 2 kinds: "long shoots" or shoots of unlimited growth bearing scale leaves without chlorophyll and with woody decurrent bases; in axils of scale leaves are borne "short shoots" or shoots of limited growth consisting of a few scale leaves at the base of a very short stem and ending in 2 or more longer needle-like leaves, the short shoot finally falling off entire. Stroboli occupying the position of a "short shoot" and of limited growth, consisting of a few basal scale leaves and an axis bearing sporophylls. Cones maturing in 2 or 3 years, ovuliferous scale very large, persistent, bract-scale minute, disappearing in adult cone; seeds usually winged, cotyledons 4–15.

70–100 species, northern temperate and mountains of northern tropics; numerous species cultivated Australia; 1, possibly 3 species naturalized south-eastern Queensland.

- | | | | | | | |
|---|---|---|---|---|------------------------|---|
| 1. Leaves 10–15 cm long; cones obliquely ovoid | . | . | . | . | 1. <i>P. radiata</i> | |
| Leaves 15–25 cm long; cones ovoid to conical | . | . | . | . | . | 2 |
| 2. Leaves dense, dark green, usually in 2's; cone scales with raised umbo ending in stout prickles 1–2 mm long | . | . | . | . | 2. <i>P. elliottii</i> | |
| Leaves fine, yellowish green, usually in 3's; cone scales with umbo ending in minute prickles less than 1 mm long | . | . | . | . | 3. <i>P. caribaea</i> | |

1. **Pinus radiata* D. Don

RADIATA PINE; MONTEREY PINE

Pinus insignis Douglas ex Loudon

Tree up to 30 m tall; bark dark brown, divided into deep ridges. Leaves in 3's, densely crowded on branchlets, lasting 3 or 4 years, dark green, linear, rigid, acute, margin serrulate, 7.5–15 cm long, basal sheath persistent, 0.5–1.2 cm long. Male stroboli numerous in sessile clusters, cylindrical, 1–1.5 cm long. Cones very shortly pedunculate, obliquely ovoid, outer side larger than inner, solitary or in clusters of 3–5 surrounding branch, reflexed when mature, 7–15 cm \times 6–8 cm when closed, scales glossy, greyish brown, broad, thick, woody, rounded; seeds blackish, ellipsoid, ca 6 mm long, with a well developed wing ca 2.5 cm long. **Fig. 64B.**

Native of Monterey County, California, United States of America, where its distribution is limited to a very small area of hilly ground near the sea, but extensively cultivated elsewhere for its timber, particularly in New Zealand and the south-eastern states of Australia; cultivated in forestry plantations in the eastern Darling Downs district mainly around Toowoomba and Passchendale where it appears to have become locally naturalized. Also cultivated as an ornamental tree in parks and gardens.

2. **Pinus elliottii* Engelm.

SLASH PINE

Tree up to 30 m tall, often free from branches to a considerable height; bark greyish to reddish brown, shed in large flat broad plates. Leaves in 2's or 3's, crowded at ends of branches, usually shed in 2nd year, dark green, linear, rigid, acute, channelled, margin serrulate, 17.5–25(–30) cm long, basal sheath persistent, light brown becoming grey, 1–1.8 cm long. Male stroboli numerous in sessile clusters, cylindrical, 2.5–6 cm long.

Cones subterminal, spreading or reflexed, conical or narrowly ovoid, usually 6–15 cm × 3–6 cm when closed, deciduous, scales brown, spreading or slightly reflexed, umbo raised, ending in a stout prickle 1–2 mm long; seeds black or mottled grey, ovoid, *ca* 6 mm long, with a well developed deciduous wing 1.5–3 cm long. **Fig. 64A.**

Native of south-eastern United States of America, but has been extensively cultivated elsewhere for its good quality timber; cultivated in forestry plantations on the Darling Downs and in the Beerburum and Maryborough areas on the poorer sandy soils, now often seen in the coastal districts naturalized near forestry plantations due to its prolific seeding.

This species is known to hybridize with *P. caribaea*.

3. **Pinus caribaea* Morelet

CARIBBEAN PINE

Pinus bahamensis Grisebach

Tree up to 30 m tall, often free from branches to a considerable height; bark grey to reddish brown, fissured and eventually shed in large flat wide plates. Leaves usually in 3's, rarely 4's or 5's, or 2's, crowded at ends of branches, usually falling in 2nd year, light or yellowish green, linear, rigid, apex a horny point, margin serrulate, 15–25 cm long, basal sheath persistent, light brown becoming dark brown or blackish, 1–2 cm long. Male stroboli numerous in sessile clusters, 1–3 cm long. Cones subterminal, reflexed, conical, 5–10(–12) cm × 2.5–3.5 cm when closed, deciduous, scales tan or reddish brown, spreading or reflexed, swollen, ending in a minute prickle less than 1 mm long; seeds usually mottled grey or light brown, narrowly ovoid, *ca* 6 mm long, with a well developed usually persistent wing *ca* 2.5 cm long.

Native of the Caribbean region of America, Bahamas, western Cuba to Guatemala, Honduras and Nicaragua; becoming extensively planted in coastal pine plantations in Queensland where not subjected to frosts, likely to be locally naturalized in future.

This species is known to hybridize with *P. elliottii*.

Other species which may be encountered in south-eastern Queensland include:

***Pinus patula* Schlechtendal & Chamisso**, SPREADING LEAVED PINE or PATULA PINE, a native of Mexico, was planted on sites in south-eastern Queensland subject to frost but is no longer planted. It can be distinguished by its reddish trunk, slender drooping bright green foliage, leaves usually in 3's, and lateral persistent cones.

***Pinus taeda* L.**, LOBLOLLY PINE, a native of southern and eastern United States of America, was planted on the better soils around Beerburum and Gympie but is no longer planted. It can be distinguished by its pale green leaves in 3's which tend to become infected with sooty mould, and its lateral cones, with the ends of the scales with a transverse elevated ridge ending in a stout-based reflexed spine.

202. ARAUCARIACEAE

Dioecious or monoecious trees. Leaves spirally arranged, narrow or broad, venation longitudinal, parallel. Male stroboli axillary or terminal, dense, cylindrical, with numerous spirally arranged sporophylls, each with few–numerous discrete microsporangia on lower surface; female stroboli lateral or terminal, sporophylls spirally arranged, woody, ovule 1 per scale, reversed or reflexed, centrally placed. Cones generally large, falling when seeds are ripe; seeds flattened, cotyledons 2.

2 genera with 38 species, South America, New Zealand, southern Pacific Is, Australia, New Guinea, south-eastern Asia; 2 genera with 5 species Australia; 2 genera with 3 species south-eastern Queensland.

1. Leaves obtuse or blunt with petioles 2 mm or more long; seeds free from sporophyll, unequally winged, or on one side only
- Leaves acute to pungent pointed, sessile or with petiole less than 2 mm long; seeds adnate to scale, wingless or ± equally winged

1. *Agathis*
2. *Araucaria*

1. AGATHIS Salisb.

Monoecious trees with irregularly whorled branches; bark flaky. Leaves coriaceous, flat, spirally arranged. Male strobili axillary or lateral, surrounded by a few imbricate scales at base; female strobili lateral or terminal. Cones large, globular-ovoid to oblong-ovoid, scales closely imbricate, deciduous, flattened, very broadly cuneate, margin \pm winged, apex slightly thickened; seeds oblong or cuneate, free from scales, flattened, truncate or emarginate at end, one margin produced into horizontal or decurved wing.

20 species, Indochina and western Malaysia to New Zealand; 3 species Australia; 1 species south-eastern Queensland.

1. *Agathis robusta* (C. Moore ex F. Muell.) F. M. Bailey

KAURI PINE

Dammera robusta C. Moore ex F. Muell.; *Agathis palmerstoni* F. Muell.

Tall symmetrical tree up to 50 m tall and 2.4 m diameter, trunk straight, not buttressed. Leaves alternate; petioles 2–9 mm long; blades stiff, very narrowly oblong, narrowly ovate or narrowly elliptic, on young trees often broader, apex obtuse to blunt or acute, base cuneate to attenuate, 5–13 cm \times 0.9–4 cm, glabrous, veins fine, longitudinal, \pm parallel. Male strobili generally axillary, sessile or on peduncles up to 1.2 cm long, cylindrical, 4–8.5(–10) cm \times 0.7–0.9 cm at maturity. Mature female cones globular-ovoid to obloid or cylindrical, 9–15 cm \times 8–10.5 cm, scales at about the middle broadly cuneate, 3.5–4 cm \times 4–4.5 cm; seeds narrowly ovoid to \pm sagittate, 1–1.2 cm \times 0.5–1 cm, with obovate wing usually developed on one side only, up to ca 2 cm long. **Fig. 64C.**

Recorded from the Wide Bay district from about Tewantin to Maryborough and Fraser I., in rainforest. Timber used for lining, indoor fittings and cabinet work but now little used in south-eastern Queensland due to scarcity of trees. Often planted for ornamental purposes, particularly in parks.

2. ARAUCARIA Juss.

Usually monoecious, often tall trees, branches almost whorled. Leaves spirally arranged, often acicular or pungent pointed. Stroboli terminal on short lateral branches; male sporophylls with 6–20 microsporangia. Cones large, ovoid or globular, scales very numerous, closely imbricate, margin usually winged, apex thickened and woody with raised transverse line often produced into point; seeds flattened, obovoid-obloid, not winged, adnate to scale at base, free at apex, embryo with 2 cotyledons.

18 species, New Guinea, eastern Australia, New Zealand, Norfolk I., New Caledonia, and South America; 2 species Australia, both occurring in south-eastern Queensland.

1. Tree with rather open crown and spreading to ascending branches;
leaves 0.6–0.8 cm long

1. *A. cunninghamii*

- Tree with characteristic dome-shaped crown and somewhat drooping
branches with upturned ends; leaves 1–6.5 cm long

2. *A. bidwillii*

1. *Araucaria cunninghamii* Aiton ex D. Don

HOOP PINE

Tall symmetrical tree up to 50 m tall, trunk almost cylindrical; bark horizontally cracked or wrinkled. Leaves spirally arranged; juvenile leaves acicular, flattened, 8–10 mm long; adult leaves closely imbricate, rigid, narrowly triangular or triangular, incurved, sessile, 6–8 mm \times 1.5–5 mm at base, leaves below cones shorter. Male strobili terminal at the ends of twigs, sessile, ca 3–6 cm long. Mature female cones ovoid to globular-ovoid, 7–10 cm \times ca 6–8 cm, shortly pedunculate; sporophylls thinly winged, ca 2–2.5 cm long, with stiff upcurved apical point ca 5 mm long; seeds embedded in sporophylls on shedding. **Fig. 64D.**

Recorded from the coastal districts and the Great Dividing Ra., e.g. Bunya Mts, in or near rainforest or depauperate rainforest on a wide range of well drained soils, from near sea level to an altitude of about 1000 m. Used extensively for plywood and is an excellent timber for indoor joinery, also boat building and furniture. Cultivated in forestry plantations in rainforest situations, also planted as an ornamental tree in parks.

2. *Araucaria bidwillii* Hook.

BUNYA PINE

Tall tree up to 45 m tall, with symmetrical dome-shaped crown; bark flaky. Leaves spirally arranged but become 2-ranked through twisting of leaf bases; sessile or petioles

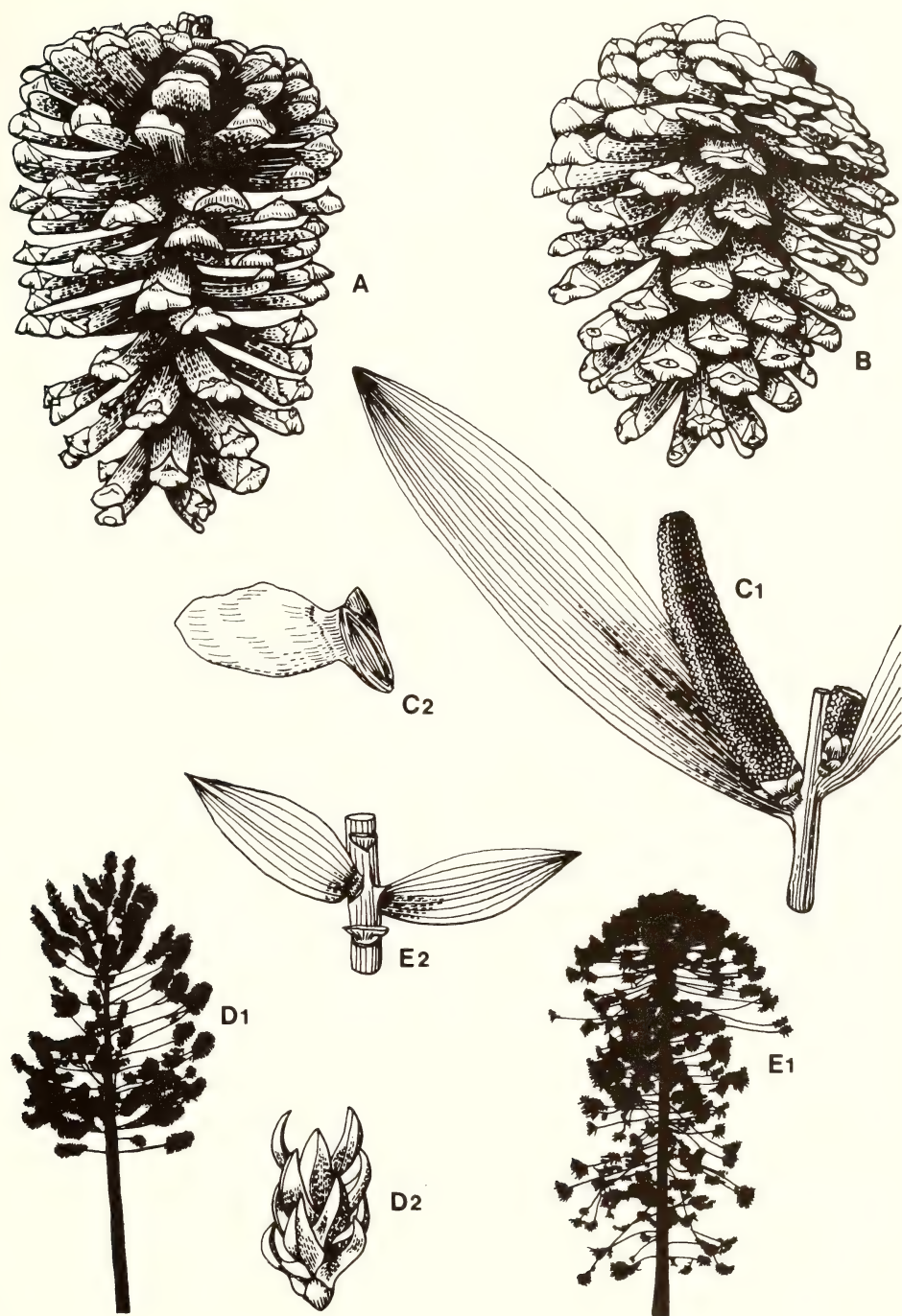


Fig. 64 A-B PINACEAE — *Pinus* spp. — A *P. elliotii*, fruit $\times \frac{1}{2}$; B *P. radiata*, fruit $\times \frac{1}{2}$; C-E ARAUCARIACEAE — C₁-C₂ *Agathis robusta*, C₁ male inflorescence $\times 1$, C₂ seed showing wing developed only on 1 side $\times 1$; D-E *Araucaria* spp. — D₁-D₂ *A. cunninghamii*, D₁ silhouette, D₂ part branchlet $\times 2$; E₁-E₂ *A. bidwillii*, E₁ silhouette, E₂ leaves $\times 1$.

up to 2 mm long; blades ovate, obovate to narrowly oblong-elliptic, apex pungent pointed, base truncate or cuneate, 1–6.5 cm \times 0.6–1.5 cm, discolourous, venation longitudinal, obscure. Male strobili terminal or on short lateral branches, up to 20 cm long. Mature female cones ovoid, up to 20 cm \times 30 cm, sporophylls woody, 5–15 cm broad, with stiff upcurved apical point *ca* 1.5 cm long; seeds ovoid, *ca* 5 cm long, embedded in sporophylls. **Fig. 64E.**

Recorded from the Moreton district from about the Conondale Ra. area northwards to the Gympie area in the Wide Bay district and west to the Bunya Mts between *ca* 150 m and 1000 m altitude, normally found as an emergent over tropical rainforest, often in association with HOOP PINE. Timber similar to that of HOOP PINE and has been used for similar purposes. Prior to and during the early days of European settlement in this region, the seeds were an important article of food to the aboriginal people, either raw or roasted.

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Muelleria

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Proceedings of the Royal Society of Queensland

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